THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
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# COMPUTERWORLD

## D&B Software guru offers Lotus vision

BY NELL MARGOLIS
and SALLY CUSACK
CW STAFF

CAMBRIDGE, Mass. — Less than a year into what had been hailed as a pivotal post as executive vice president and chief technology officer at Dun & Bradstreet Software, industry veteran John B. Landry III left last week to take a similar post at Lotus Development Corp.

Landry will replace Frank King, whose departure is effective Dec. 31.

Ironically, King'a arrival at Lotus in 1988 was also hailed as pivotal, given his charge to get Lotus' development efforts back on track and on schedule. Lotus Chief Executive Officer Jim Manzi declined to characterize King'a departure as either a dismissal or a resignation, saying only that the decision for him to leave was a mutual one.

### Positive motion

The move, which reunites the 44-year-old Landry with three-time former partner and current Lotus marketing head Robert K. Weiler, was lauded by analysts as a savvy move for Landry and a slick catch for Lotus, which has had an up-and-down year.

However, for some users and analysts, the latest round of executive shuffling at Lotus raised unsettling questions about the fate of D&B Software'a Landry-launched client/server line.

**Landry** *claims he completed his mission at D&B Software*

"[D&B] users I have talked to have noticeable concerns," said Scott Davey, applications manager at Van Waters & Rogers Corp. in Kirkland, Wash.

*Continued on page 93*

## DEC boxes set to singe Sun

*Unix workstation entries could reverse decline in DEC market share*

BY MARYFRAN JOHNSON
CW STAFF

Digital Equipment Corp. will drop its horns and charge aggressively into the low-end workstation market next week, chasing after a red cape held by market leader Sun Microsystems, Inc.

Some industry analysts said they believe this Unix-based workstation rollout could mark the beginning of a return to competitiveness for DEC.

Others are skeptical that the company can do any more than hold its own while awaiting the 1992 arrival of its powerful new Alpha reduced instruction set computing machines or the fruits of the Advanced Computing Environment desktop consortium.

### The new players

The Maynard, Mass.-based vendor plans to announce a pair of entry-level workstations — one diskless model is priced below $4,000 — plus price/performance improvements on all Decstation 5000s, which run Ultrix, DEC'a Unix variant. DEC will also replace the poorly received Decsystem 5800 with a new high-end system that packs improved graphics capabilities and expanded storage, according to sources close to the company.

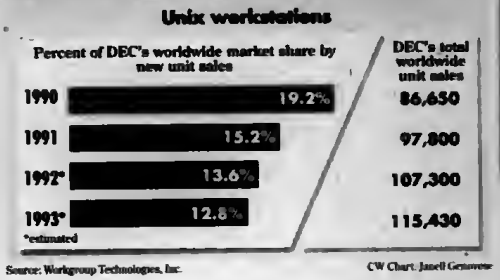
"This will position DEC a little differently. Maybe someone about to buy Sun will think about DEC as well," said Judith Hurwitz, an analyst at Patricia Seybold's Office Computing Group in Boston.

The engine powering the new products is a speedier, enhanced version of the Mips Computer

*Continued on page 92*

**High aspirations**

*DEC attacks the Unix workstation market to reclaim lost market share*




Source: Workgroup Technologies, Inc.

CW Chart: Janell Genovese

## IBM restructuring to shift power from mainframe execs

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — For years, IBM has talked a good game about transforming itself into a different kind of company. Now, faced with mushrooming evidence that users who have to move quickly, affordably and effectively will not stay with a vendor that cannot do the same, the firm is poised to practice what it has preached, sources close to the company said last week.

Over the next several weeks, according to several such sources, IBM plans to implement a series of structural changes that will break the iron grip long held on the firm's way of doing business by a small group of mainframe-oriented executives. That power will be redistributed among a more diverse group of managers who are physically and psychologically situated closer to the customers they serve.

### Independent units

While details are still being worked out, the new organizational blueprint contemplates loosely allied units, divided along both product and geographical lines, each headed by a manager empowered to make product and marketing decisions — and obligated to show a healthy profit. The newly autonomous units, sources said, will be forced to negotiate with one another at arm's length.

IBM has promised this direction before but has yet to deliver. One favorable sign that this time might be different came last

*Continued on page 93*

## Distributed management tools coming

BY ELISABETH HORWITT
CW STAFF

Help is on the way for users struggling to manage their companies' burgeoning hodgepodge of distributed local-area network-based client/server systems.

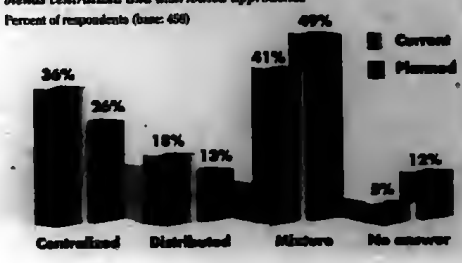
Digital Equipment Corp. and Hewlett-Packard Co. executives said that announcements next year will address at least two of their biggest concerns: the need to combine distributed network management with some degree of centralized monitoring and control and the need to manage not just the physical network but also the client/server systems and applications that communicate over those links.

For many users, DEC'a and HP'a strategic directions are just what the network doctor ordered. For example, 3M Co. wants to correlate network

*Continued on page 92*

**Mix and match**

*Most users are embracing a network management strategy that blends centralized and distributed approaches*




Source: Datapro Research Corp.

## INSIDE

**EG&G's Bob Curran** takes a 'schizophrenic' approach to managing IS. Page 57.

**IBM,** true to its word, ships Officevision/DOS for Windows. Page 4.

**Executive Report** — Technology for disabled workers: How ready is your firm? Page 63.

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# IN THIS ISSUE


### NEWS

**4** IBM bit the bullet last week and unveiled Officevision/DOS for Microsoft's Windows.

**6** The city of San Jose, Calif.'s Wang VS 10000 has run out of juice to provide adequate horsepower for the growing city's computing needs.

**7** Compuadd and Sysorex Information Systems are flying high after landing a contract with the U.S. Air Force for 300,000 PCs.

**8** Streamlining was in order at Knowledgeware as it cut its work force back 22%.

**10** Patients would be smart to carry their 'smart cards' because the federal government has called for a paperless health-care system to keep medical records straight.

**12** Users packed The User's Open Systems Conference in an effort to find out where open systems is headed and why the process is taking so long.

**92** Dutch hackers break into U.S. Department of Defense computers and wreak havoc on files related to the Persian Gulf war.

**93** Systems with speeds approaching 1 trillion floating-point operations per second still seem to target research scientists, Supercomputing '91 showed.


## Quotable

*"We are not spending money [anymore] on things customers don't want to buy."*

ELLEN HANCOCK
IBM

*In a panel discussion on the future of open systems at the User's Open Systems Conference. See story page 12.*


### SYSTEMS & SOFTWARE

**27** AS/400 users want System/36, 38 users to know that this is 'D' series to get.

### PCs & WORKSTATIONS

**35** Pen-based technology has a way to go before being capable of fulfilling users' current needs.

**41** Technology Analysis: AST Research's Premium II modular PC is well-designed but expensive, and Northgate's SP modular PC is aggressively priced with strong support.

### NETWORKING

**45** ISDN's accessibility in Europe has been slow to get off the ground, but the future holds promise.

### MANAGER'S JOURNAL

**57** The 'schizophrenic approach to management' works best for EG&G's Bob Curran.

### COMPUTER INDUSTRY

**73** Less than a year after launching a multimedia LAN product, Commtex puts itself on the auction block.

### EXECUTIVE REPORT

**63** New federal laws for 1992 will bring a fresh wave of users with disabilities into the workplace. How ready is your business?

### IN DEPTH

**69** Why U.S. firms' hefty spending on information technology has not translated into major productivity gains. By Gary Loveman.

### DEPARTMENTS

**8, 91** News Shorts
**20** Advanced Technology
**24** Editorial
**62** Book Reviews
**77** Computer Careers
**78** Tip of the Month
**86** Marketplace
**90** Stocks
**94** Inside Lines


## The 5th Wave

"I ALWAYS BACK UP EVERYTHING."

# EXECUTIVE BRIEFING

■ **A new federal law outlawing discrimination against workers with disabilities** will require changes in everything from computer interfaces to voice mail in many companies, experts say. When the Americans with Disabilities Act becomes effective on Jan. 26, many IS departments will be unprepared. **Page 63.**

■ **Lotus' top technology officer, Frank King, leaves the company** in the wake of Lotus' 1-2-3 for Microsoft Windows' disappointing debut in September. John Landry, who until last week held a similar technology post at Dun & Bradstreet Software, steps in as senior vice president of software development and chief technology officer at Lotus. **Page 1.**

■ **The regional Bell operating companies (RBOC) get the go-ahead** to offer enhanced services, and the FCC strengthens its safeguards to prevent the RBOCs from illegal pricing and discrimination. **Page 7.**

■ **DEC will go after Sun Microsystems** with a pair of entry-level workstations, an improved Decstation 5000 and a replacement high-end system for the Decsystem 5800. **Page 1.**

■ **Federal Express' top IS executive, Ron J. Ponder,** is leaving after 14 years to join Sprint/United Telecom as chief information officer. **Page 6.**

■ **Knowledgeware plans to cut 22% of its 900-member work force,** but some analysts said they doubt staff trimming alone will be enough to return the company to profitability quickly. **Page 8.**

■ **IBM took the wraps off Officevision/DOS for Microsoft's Windows** last week, but Windows users are not eager to move over to the integrated desktop office application offering. **Page 4.**

■ **Little-known Compuadd and Sysorex Information Systems** beat out larger rivals for a U.S. Air Force contract worth $667 million in the first year and $1 billion over five years. **Page 7.**

■ **There may finally be a way to measure the quality of service** that IS groups provide to users. First Union National Bank worked with a consulting firm to develop a survey methodology that shows the bank's IS unit how well it is doing. **Page 57.**

■ **Dutch hackers ransacked U.S. Department of Defense computers,** modifying or copying information linked to military operations during the Persian Gulf war. **Page 92.**

■ **Six months down the road from their introduction, IBM's AS/400 D models have satisfied users.** What remains to be seen, however, is whether this latest generation of machines will lure IBM System/36 and 38 users into the AS/400 world. **Page 27.**

■ **The shift to a user orientation spurred X/Open to seek out varied Unix user groups for help** in an effort to address questions about open systems topics such as graphical user interfaces and mainframe data access. **Page 31.**

■ **Commercial users are finding their way onto Internet,** the maze of networks that had been limited to the research and education sectors. **Page 50.**

■ **On site this week:** Mennen doesn't normally consider itself to be a risk taker in terms of information technology. However, it took a chance when it replaced its host, operating system and tape system in one stroke. **Page 31.** It's not snow that makes weather forecasting tough in Alaska; it's the volcanoes. Clouds of volcanic ash complicate the Alaska weather scene enough for the U.S. Weather Service to install a workstation-based forecasting system there. **Page 40.** Wait if you have to and get it right the first time is the apparent motto of GE Nuclear, which is moving forward with networking plans. **Page 45.**

"To me, service and support are the two most important words in this business. And CA agrees. I don't know any vendor, hardware or software, that does as much today to help its clients as CA does."

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# Officevision for Windows ships

*Users want to see more deliverables, however, and are not rushing to buy*

BY JAMES DALY
CW STAFF

WHITE PLAINS, N.Y. — Anxious to make some headway on the desktop, IBM bit the bullet last week and unveiled Officevision/DOS for Microsoft Corp.'s Windows.

Few Windows users, however, sounded eager to try IBM's integrated desktop office application offering.

"We're not going to embrace the Officevision world until we see more deliverables," said Christopher Waldron, senior information systems analyst at Hershey Foods Corp. in Hershey, Pa. The most important one of those deliverables is an improved — and long delayed — local-area network version of Officevision, expected next year.

Users have also clamored for improved Officevision connections with third-party applications.

Officevision/DOS for Windows, which was announced in early July [CW, July 1] but was first made available last Friday, provides users with the ability to attach Officevision clients running Windows to an OS/2 server. In June, users were to have gained the ability to launch a DOS application from an Officevision desktop.

Although IBM's OS/2 is still battling Windows for operating system dominance, analysts said, IBM needs to make Officevision open to all comers.

"This is all about adaptability and flexibility: IBM has learned that [it] can't force customers into their own little molds," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. Dzubeck suggested that the latest Officevision release was designed to entice users turned off by Officevision's initial snub of DOS and Windows.

### Bumpy road to desktop

IBM has faced rough sledding with Officevision on the desktop, which originally featured limited DOS and no Windows support. IBM officials said they expected people to put the then 8M-byte OS/2 Extended Edition package on every client.

IBM patched together a DOS bridge with Consumer Software, Inc., but it did not go far enough to suit most users. Hence, earlier this year, Tony Mondello, who was then heading up the troubled Officevision project, promised to deliver a Windows version by year's end.

In a July interview, Mondello promised to provide the following enhancements for December delivery: an Officevision version that can tap into Apple Computer, Inc.'s Macintosh environment; support for Novell, Inc.'s Netware/386 Level 3.11 and Netware/286 Level 2.2; additional office application programming interfaces for mail and address books; and support for a 16-bit Officevision LAN under OS/2 2.0, which was supposed to ship by year's end.

Reiterating IBM's statement in July, an IBM spokesman said IBM did not have a ship date for what has been known as the 32-bit Officevision LAN Release 2.0. In July, IBM also declined to provide a delivery date for the direct connect workstation to host links.

Still, analysts noted, Officevision/DOS for Windows was designed more to accommodate the installed base of Officevision users who want to tap into a Windows environment than as a lure to Windows users. "Officevision users have more demands on their desktop than a 3270- or an OS/2-based PC, and IBM has come to realize that," Dzubeck added.

### Officevision's slippery track

| | |
|---|---|
| May 1989 | IBM announces Officevision, its first SAA application. |
| March 1990 | Second release of Officevision is delayed amid indications that IBM is struggling to deliver SAA software. |
| October 1990 | An IBM executive indicates Officevision will recognize Windows and Unix, neither of which is part of SAA. |
| January 1991 | IBM admits more problems with Officevision. It will not provide a new date for Release 2.0. |
| February 1991 | IBM misses second revised delivery date for second generation of Officevision LAN. |
| July 1991 | IBM promises Windows and Netware support by December, along with mail and address APIs. |
| November 1991 | IBM ships Officevision/DOS for Windows. |

Along the way, it could also spark interest in Windows users. "OS/2 is still a new animal to us at this point, but if IBM were to make it more accessible, it's something we'd consider," said Suzanne Hale, a senior technical writer at Sierra Health Services, Inc. in Las Vegas.

Separately, IBM also beefed up the Officevision line with two other offerings last week: Officevision/VM Version 1.2 and Current-Officevision/VM Workgroup Program. Officevision/VM Version 1.2, expected to be available on March 27, 1992, adds new mail and editor enhancements. It will allow users to work with multiple notes and documents and with a new, customizable user interface to sort and search mail by specific key words, IBM spokesman Tim Breuer said.

IBM's Current-Officevision/VM Workgroup Program combines the function of a Windows-based information manager with Officevision/VM. By providing IBM's Current personal information manager as a front end to Officevision/VM, users will have the ability to access Officevision functions on its System/370 computers from workstations with an easy-to-use Windows graphical interface.

# PC makers to abandon 'suggested' retail prices

BY CAROL HILDEBRAND
CW STAFF

Nothing appears sacrosanct in the personal computer hardware business these days as prices plunge and vendors struggle to jump-start a stubbornly stagnant market. The latest sacred cow headed to the slaughterhouse appears to be "suggested" retail prices.

"Manufacturer's list price in business is going away," said William Tauscher, chairman and chief executive officer at Computerland Corp., speaking at PC Expo in Chicago last week. "They're already partly abolished in Europe, and they're going to go away here."

As prices continue to plummet, vendors are exploring an increasing variety of distribution methods to get their hardware to the broadest segment possible, resulting in an equally broad variety of prices.

### What's in a price?

Industry observers question the validity of retail prices, noting that street pricing typically runs at a 30% to 50% discount. Already, some movement away from list pricing is in motion.

Compaq Computer Corp.'s European operations have dropped suggested retail pricing, and an IBM spokesman said the firm is reportedly considering making the same move in the European theater.

Tauscher predicted that as dealers move to what he called "cost plus" pricing, list pricing would go away "within a year."

However, some analysts said that cost plus — or prices marked up on the basis of such value added as service and support — was just tarring the same icon with a different brush. "What they call list price today might end up as something like cost plus or single-unit pricing. What they call it is irrelevant," said Joe McGlone, president of McGlone & Co. in Westport, Conn. McGlone said changing list pricing basically meant changing the traditional 30% vendor markup to get in line with the mail-order houses.

Most observers said that abolishing list prices would not have much of an effect on corporate buying, which tends to deal in volume discounts. The added hassle of hunting for the lowest price with nothing to compare it to would fall on small to medium-size businesses, as well as home buyers.

"It may make life a little more complicated for smaller users," said John Venator, executive vice president and CEO at ABCD: The Microcomputer Industry Association in Schamburg, Ill. Venator said corporate buyers will see little change, however.

### Trouble for individuals

Mary Lou McPherson, an extension specialist in the computer services department at Michigan State University, said that while such a system would add more buying power for the university, "for an individual, having to be aggressive on pricing could be a problem."

Others said they saw nothing wrong with giving suggested pricing the boot. Anthony Best, a data processing procurement analyst at the Bureau of Data Processing for the state of Mississippi, said retail pricing is becoming somewhat moot. "It used to be that we could take retail price and equate what the street price would be from that," he said. "Now, we can't."

According to Best, "Retail doesn't matter much to us at all" at this point.

# What's next on the chopping block?

The domino effect of hemorrhaging price levels in the desktop hardware segment showed no signs of abating last week, as another round of companies took machetes to their price structures.

IBM, which has been busily wielding the price ax this month, cut prices on its Personal System/2 Model L40SX laptop from $3,995 to $3,645 — more than an 8% drop. IBM had cut prices on the L40SX on Oct. 3.

Wyse Technology, Inc. announced a 15% reduction on the price of its Decision 486/25 and 386/25 PCs. The suggested list price of the 486 line has had a $500 chunk cut out of it, while the 386 line had $300 lopped off. Prices now range from $1,699 for a 386/25 Model 01 to $5,099 for a 486/25 Model 300E.

Acer America Corp. took an even steeper price dive, announcing a 20% cut on the price of its Aceranywhere 1120NX notebook computers while increasing main memory from 1M to 3M bytes. Prices now range from $3,195 to $3,595.

Finally, Advanced Logic Research, Inc. announced 25% price cuts on it Powerflex 20-MHz 486SX configurations. Tags now range from $1,495 to $2,795.

At least two other companies are taking slightly different tacks. Computer Direct, Inc., a mail-order vendor based in Barrington, Ill., announced it would sell a 16-MHz Intel Corp. 80386SX desktop computer for $399.95. The computer comes with start-up files for Digital Research, Inc.'s DR DOS 5.0 and is an otherwise bare-bones model — even a video card is optional, and it comes without a monitor or a hard drive. PC Prod/Touche in Northbrook, Ill., is giving customers a free 386/SX 20-MHz PC when they purchase either an I486 33-MHz Extended Industry Standard Architecture or ISA PC.

CAROL HILDEBRAND and MICHAEL FITZGERALD

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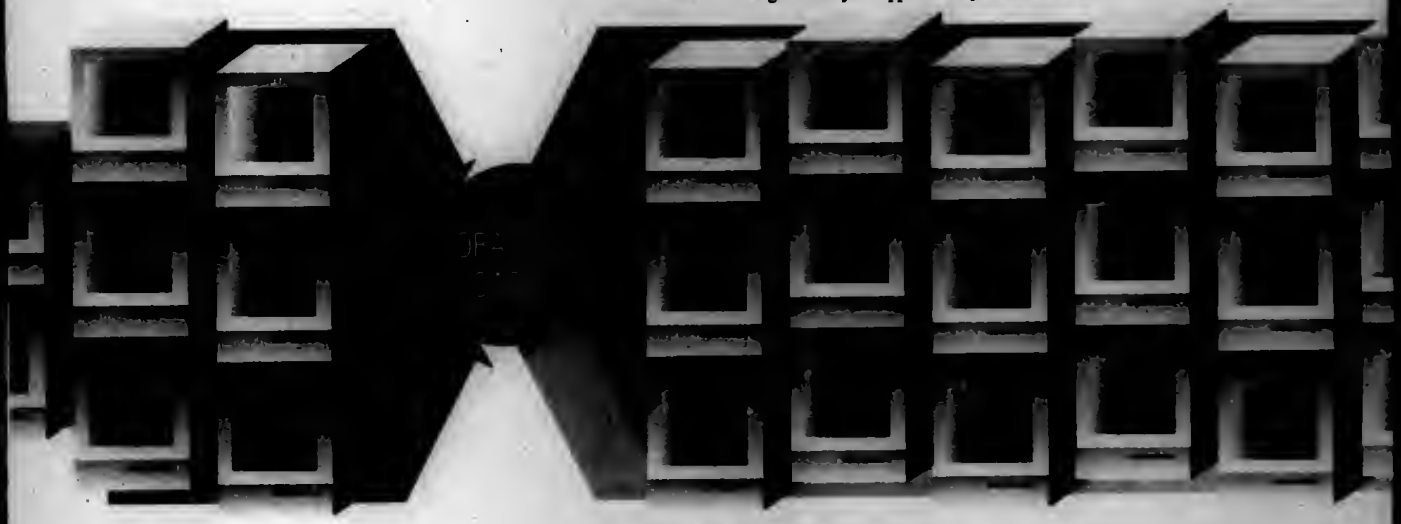

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# City finance system stalls out, boosts costs

BY JEAN S. BOZMAN
CW STAFF

SAN JOSE, Calif. — The system that handles the finances for the third largest city in California has hit a dead end in performance — and its shortcomings are burning a hole in the city's already overextended budget.

The San Jose City Council — which faces a $21 million deficit in its $1 billion fiscal 1993 budget — may have to spend $250,000 more for an auxiliary computer that can provide adequate horsepower. Eventually, it may be used to replace the city's Wang Laboratories, Inc. VS 10000 as a host for the 3-year-old Munifax financial software system from Nissi Technologies, Inc. in Vancouver, British Columbia.

The factors most blamed for the system slowdown are a mismatch between the city's size — explosive growth in the late 1980s pushed its population to 750,000 — and the inability of the VS 10000 to run Nissi's Cobol application software at high transaction rates. Clearly, something has to be done.

"Our primary concern is that we have a functioning system," said Darrell Dearborn, deputy city manager. "If we don't have a functioning system, then the question becomes, 'What does it take in money to make it so?' "

"The Wang machine is not malfunctioning," said Ellis Jones, San Jose's director of information systems. "The key is the work load. That's what is causing the poor performance. [The VS 10000's] throughput on batch jobs or on report production is the real issue now."

File sizes have grown since 1989, and carry-forward budgetary items are clogging the system, which has a 12G-byte disk drive capacity.

As configured, the $4.4 million financial system cannot run heavy batch jobs while interactive jobs are running. As a result, all 120 end users were forced off-line while year-end accounting took place after the close of fiscal 1991 on June 30.

**Largest customer**

Also at issue is Nissi's small size: The 11-year-old firm has only 30 employees, including one support person who works near San Jose.

"We're Nissi's largest municipal customer by a long shot," said Jones, who administers a $4 million IS budget and a 58-person staff. "This software just hasn't been used in an environment like ours before," he said, explaining that there did not appear to be any problems until the city's work load exploded.

A 1990 attempt to improve performance by boosting the hardware resources did not end the problem. Even after San Jose's smaller Wang 7310 was upgraded to a top-of-the-line Wang VS 10000, the financial system still ran so slowly that its reporting applications were shifted to the city's Digital Equipment Corp. Vaxcluster.

Now San Jose believes it can relieve the problem by adding a $250,000 auxiliary Unix computer that also runs the Nissi software. By January, San Jose expects both IBM and DEC to compete for the contract by building prototype systems that San Jose can use — at no charge — for more than four months.

"We want to get some experience relevant to moving the whole system to a Unix platform," Jones said.

IBM is expected to bid a reduced instruction set computing (RISC)-based RISC System/6000 system running AIX, while DEC's entry — not yet determined — will be based on DEC's Ultrix version of Unix, Jones said.

The attraction of a RISC-based Unix machine is raw speed, IS managers here said.

"If we move the applications over to the RS/6000, we would expect them to run three to five times faster," said Gary Zouzoulas, San Jose's assistant IS director.

Nissi is willing to help San Jose migrate its applications to IBM's AIX, or even to DEC's Ultrix, which the software developer does not currently support, according to company President Bruce Elliott.

In the interim, Wang is willing to help the city add to its hardware resources, a spokesman for the Lowell, Mass., computer vendor said.

# Ponder departs Fedex for Sprint/United CIO spot

BY ELLIS BOOKER
CW STAFF

MEMPHIS — Federal Express Corp.'s top information systems executive, Ron J. Ponder, resigned last week to join U.S. Sprint Communications Co./United Telecommunications, Inc. as chief information officer.

Ponder joins an $8.3 billion company (in 1990) whose telecommunications empire spans long-distance telephone provider Sprint and United Telecom, which runs telephone operating companies in 17 states. As an executive vice president, he will report directly to Sprint/United Chairman and Chief Executive Officer William T. Esrey.

*Ponder takes on bigger staff, budget*

"I'm leaving a fine company full of fine people," Ponder said, "but it was an opportunity I couldn't pass up."

During his long tenure at Fedex, Ponder was credited with having delivered some of the most innovative information systems used by any U.S. company. His accomplishments include the Cosmos worldwide tracking system and Super Tracker, a system for reading the bar codes on packages that uses some 50,000 handheld data terminals connected over a wireless network to Fedex's headquarters in Memphis.

Ponder will now head a group of about 3,500 people at Kansas City, Mo.-based Sprint/United, up from the 2,000 employees he managed in Fedex's IS and telecommunications departments. He also estimated that the IS budget at Sprint/United will be about twice that of Fedex, or approximately $468 million.

Sprint may offer a bigger budget and a larger staff, but Ponder said the cultures and technology needs of both companies are very similar. "I see them both in the service business," the Arkansas native said in his southern drawl.

The IS function at Sprint/United has reported through Executive Vice President and Chief Financial and Information Officer Art Krause, who took on this title in December 1989 following the departure of Cliff Hall, an executive vice president and CIO at Sprint. Last year, however, Krause took over direct responsibilities for the function — and instigated the job search that hired Ponder last week — after the departure of Sprint's Executive Vice President and CIO Clifford Hall.

Krause will continue as an executive vice president and take on the title of CFO. Ponder and Krause will operate as peers.

Ponder, 48, was a professor at Memphis State University before joining Fedex in 1977 as director of operations research and planning. In 1982, he was promoted to his current title of senior vice president and CIO.

# First CIO appointed at Blue Cross

BY ELLIS BOOKER
CW STAFF

CHICAGO — The Blue Cross/Blue Shield Association — the coordinating organization for the nation's 73 Blue Cross/Blue Shield plans — appointed its first chief information officer last week.

York Freund, who joined the organization last October as executive director of systems planning and technology support, takes on additional responsibilities as CIO. He now has overall responsibility for the association's telecommunications, end-user computing and technology resources, including its operational technology assessment consulting unit.

"The importance of the CIO moniker is not really the broadening of my responsibilities," Freund said, "but a recognition by the association of the strategic importance of information."

The association's 25 data processing personnel and seven full-time networking staff members will continue to report to Freund, who manages a $10 million annual information systems and networking budget.

The association's data center here contains an IBM 4381 and three Wang Laboratories, Inc. VS minicomputers. The Wang systems will be phased out over time. A five-year strategy is in place to replace the IBM host with up to 17 local-area network systems, ultimately available to both the association's Chicago staff and its plan members around the country, Freund said.

"We're basically building one big executive information system, and we found that the tools and database technologies we want in the future indicate a LAN architecture," he said.

Freund previously headed his own strategic planning firm.

# IBM forms partnership with CAD/CAM/CAE firms

IBM, Dassault Systemes and Cadam, Inc. last week said they will restructure their computer-aided design, manufacturing and engineering (CAD/CAM/CAE) businesses into a partnership that analysts said should benefit users and protect their product investments.

The new development relationship refocuses IBM-owned Cadam on lower end desktop products, while Paris-based Dassault assumes responsibility for mainframe Cadam and workstation Professional Cadam applications through a new office in Burbank, Calif.

IBM will acquire a minority equity interest in Dassault, and it will continue marketing products from both Dassault and Cadam.

"People can buy Cadam or [Dassault's product] Catia with the certainty of continued support from IBM," said Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass. "This should dispel a lot of doubt."

With their 30% share of the $7.2 billion CAD/CAM/CAE market, Cadam and Dassault have mainstay products for large-scale drafting and design work in more than 3,000 IBM mainframe shops.

Foundyller said both firms can now stop duplicating each other's features, and customers will not have to worry about IBM dropping support for Catia.

MARYFRAN JOHNSON

## CORRECTIONS

In the Nov. 11 Executive Report on help desks, Target Systems Corp.'s Target Hotline product was incorrectly identified as a personal computer-based system. Rather, Hotline is a Digital Equipment Corp. VAX/VMS-based package.

Also, Supportmagic is produced by Magic Solutions, Inc. in Mahwah, N.J. Strategic Microsystems Corp. in Bound Brook, N.J., produces a help desk package called CSS Customer Support System.

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A new product announcement on Nov. 18 gave an incorrect area code for Software Eclectics, Inc. The correct phone number is (404) 926-3331.

• • • • • • • • • • •

Intel Corp.'s new parallel supercomputer will have up to 4,000 CPUs, not 128 as was reported in the Nov. 18 issue.

# FCC coaxes RBOCs to unbundle network services

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission last week launched an inquiry into the future of the public networks to ensure that the regional Bell operating companies (RBOC) unbundle their services to allow greater access to their networks by providers and users of enhanced voice and data services.

The FCC, moreover, gave the RBOCs the go-ahead to offer enhanced services without having to do so through separate business units.

Under a concept called Open Network Architecture (ONA), the RBOCs have been encouraged to move the embedded software used to route and process calls out of local switches and into centralized data centers, where it can more easily be accessed and tailored to the needs of specific customers.

A petition for the inquiry was brought a year ago by the Coalition of Open Network Architecture Parties, which charged that the RBOCs' network of the future, called Advanced Intelligent Network, would not be open but would continue to restrict network access by users.

Among other things, the FCC is seeking guidance on how to balance the benefits of making networks more accessible with the alleged greater risks to security and reliability. The FCC also directed the RBOCs to augment previously filed ONA plans to include greater detail about how they will unbundle new technology, and it directed them to file annual reports on a variety of topics related to ONA.

"Getting the RBOCs to file reports is not the same as getting them to do the right thing," noted Henry D. Levine, a Washington, D.C.-based attorney. "All the noises are correct, but it's not clear there is any payoff."

According to FCC Chairman Alfred C. Sikes, the commission's actions last week said nothing of how unbundled network services might be priced, but he may have presaged future commission action by saying prices should be cost-based and free of legal subsidies that have traditionally been applied for social objectives.

The FCC also beefed up its earlier prescription for "nonstructural safeguards" to prevent the RBOCs from illegally pricing and discriminating against competing sellers of enhanced services.

The RBOCs had argued that the requirement for maintaining separate subsidiaries for information services was unnecessary and costly to consumers. The FCC agreed. Commissioner Ervin S. Duggan said the cost savings from joint marketing of enhanced and basic services might enable the RBOCs to provide services such as voice messaging that cannot be provided profitably to the mass market by other enhanced service providers.

Enhanced service providers and a number of users disagreed. In an FCC filing, the Ad Hoc Telecommunications Users Committee said the RBOCs would use their local monopoly powers to "do serious violence to the long-standing goal of encouraging and achieving a fully competitive marketplace."

The commission said it will review the safeguards issues in three years and make warranted regulatory changes.

# Small firms share big Air Force pact

BY GARY H. ANTHES
CW STAFF

GUNTER AIR FORCE BASE, Ala. — Two relative unknowns beat a number of industry giants for a U.S. Air Force contract to supply defense and civilian agencies with up to 300,000 personal computers, related equipment and office automation software.

The award, one of the largest small-computer buys ever, is estimated to bring Compuadd Corp. in Austin, Texas, and Sysorex Information Systems, Inc. in Falls Church, Va., $667 million in the first year and $1 billion over five years.

The split award is intended to encourage competition after the contract is signed. Under its terms, each company is guaranteed $4.75 million in the first year; beyond that, they will compete for orders. The Air Force hopes this arrangement will stimulate better service and eliminate the procurement bottlenecks that have plagued the Desktop III procurement, which was won by Unisys Corp.

Twenty-two vendors sent in bids, some submitting more than one proposal. The Air Force would not identify losing bidders, but IBM, Electronic Data Systems Corp., Digital Equipment Corp., Zenith Data Systems, Apple Computer, Inc., Wang Laboratories, Inc., Centel Federal Services Corp. and many smaller firms reportedly submitted proposals.

Zenith Data won the Desktop I and II awards. Unisys did not bid on Desktop IV but will continue to ship PCs under Desktop III for at least another year.

A spokesman for PC manufacturer Compuadd said the firm will ship its own Intel Corp. 80386- and I486-based machines and peripherals. Sysorex, a systems integrator, will assemble components from other vendors into PCs.


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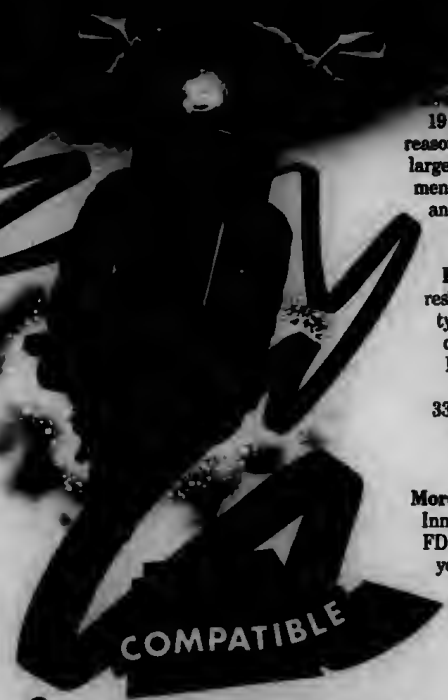


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# NEWS SHORTS

### Unisys kills Paramux IPO plans

In what could be a major setback in Unisys Corp.'a debt-reduction plan, the company unexpectedly halted the proposed initial public offering (IPO) last week of its defense unit, Paramux, Inc. "A sale in a weak market at fire-sale prices would not serve the best interests of the company and its stakeholders," Unisys Chairman James A. Unruh said. Unisys had hoped to receive some $832 million from the offering, which was announced in September. The turnabout was attributed to "unsettled financial market conditions and uncertainty about future Department of Defense budget levels and spending." The IPO was seen by some observers as an indication that Unisys had been unable to find an outright buyer for the unit.

### American Airlines trims IS spending

American Airlines' decision to slash capital spending by $8 billion through 1995 will have a modest effect on the airline'a information technology budget, a spokeswoman said. Spending for desktop computers will be reduced by an unspecified amount, and some information systems development projects will be stretched out, she added. IS spending at the parent company, AMR Corp., budgeted at $998 million this year, has been restrained because of financial troubles in the airline industry.

### Intel lawsuits net mixed results

Intel Corp. lost its bid to gain a preliminary injunction in its math coprocessor patent infringement suit against Cyrix Corp. It achieved some small court victories when antitrust claims filed by four companies were dismissed by the U.S. District Court of Oregon. The suits were counterclaims to actions taken by Intel against former distributors Tokyo Cobra Corp., Taiu Electronics Corp., Kelly Micro Systems, Inc. and Dynamic Electronics, Inc. Intel said the actions were unrelated to the antitrust suit filed against it by Advanced Micro Devices, Inc.

### Tool targets OS/2 2.0 developers

Digitalk, Inc. has announced the release of Smalltalk/V for Presentation Manager, which includes features intended for use in OS/2 Version 2.0 development. Smalltalk/V is a completely object-oriented programming language originally developed by Xerox Corp. The updated version will retail for $499.95. Users of previous versions can upgrade for $95.

### Hitachi offers migration path

Hitachi Data Systems, Inc. filled a gap in its product line last week by announcing the HDS EX 210 mainframe as an upgrade for users who have low-end EX series machines. It is the smallest HDS machine and will support all IBM Summit-class mainframe functions, HDS said. The EX 210 is rated at about 95 million instructions per second by the Gartner Group, Inc. and is a dyadic machine with two tightly coupled processors. It will ship in the second half of 1992; pricing starts at $7.8 million.

### XNS catches the Unix wave

Xerox announced last week that Xerox Network Services (XNS) will support Unix on a personal computer. Xerox Services/PC is said to bring XNS server capabilities to Intel 80386 and I486 platforms running The Santa Cruz Operation'a Unix System V/386 Version 3.2. Servers equipped with the software can provide directory, mail, file, print and communications services to networked workstations running Xerox Globalview applications. Available now, it costs $3,100.

### DEC digs deep for AIDS research

Digital Equipment Corp. said it will donate $5 million worth of equipment to nonprofit health groups worldwide focusing on the HIV virus, AIDS or Alzheimer's Disease. The computers and peripherals will be meted out in $500,000 grants to qualifying organizations through a request for proposals process running through June 1993. For more information, contact DEC'a Corporate Contributions office at (508) 493-9210.

*More news shorts on page 91*

# Layoffs hit Knowledgeware

BY KIM S. NASH
CW STAFF

ATLANTA — Amid fiscal woes, Knowledgeware, Inc. last week said it will cut 22% of its 900-member work force to bring costs in line with a reduced revenue stream.

The impending layoffs come weeks after Knowledgeware posted its first quarterly loss and was jilted by Intellicorp, Inc., a fellow computer-aided software developer that Knowledgeware had hoped to acquire.

Analysts were not surprised by the 200-worker layoff, but some doubted if across-the-board staff trimming alone would be enough to return the company to profitability quickly.

Knowledgeware'a layoffs are "gruesome but necessary," said Ed Acly, director of software research at Technology Investment Strategies Corp. in Framingham, Mass. He said the firm had upped its staff since spring in anticipation of a sales boom that never happened.

The company, once a darling of Wall Street, went on an acquisition binge earlier this year, buying Language Technology, Inc. and Quinsoft, among others. The company is now suffering from indigestion, observers said. Company executives declined to discuss the situation last week.

Knowledgeware must also address shortcomings in its product line, such as developing graphical user interfaces and tools for client/server application building.

Moreover, users have begun to reject the first generation of computer-aided software engineering (CASE) products, which primarily sold on the hype of being an integrated development environment, "a silver-bullet cure-all," noted John Palmer, a principal at Atlantic Systems Guild, Inc., a CASE consulting firm in New York. "And that's catching up with Knowledgeware now because it fulfills the promise of integrated CASE less than other vendors."

Texas Instruments, Inc. has escaped the heat because its product line plugs gaps that Knowledgeware'a does not, noted Paul Bloom, analyst at Volpe, Welty & Co. in San Francisco.

Users may be less inclined to do business with Knowledgeware because of the company'a pricing structure. DOS-based modules of Information Engineering Workbench (IEW) start at about $8,500, while Application Development Workbench (ADW) ranges from $115,000 to $210,000.

"You expect more for that amount of money," Palmer said.

Sales of ADW and IEW have fallen off dramatically in the last six months. Knowledgeware reported a $4.9 million loss on revenue of $21.6 million for the first quarter of fiscal 1992 vs. a $5.2 million profit on $40 million in sales the previous quarter.

In a written statement, Knowledgeware'a chief executive officer, Fran Tarkenton, blamed the $20 million revenue decline on the recession.

Knowledgeware executives refused to talk about recent events except to say that the company stands by its statement of direction, published in April. Knowledgeware pledged to develop local-area network-based versions of some products and to generate cooperative applications that incorporate GUIs.

"We believe we've taken appropriate decisive action to deal with the situation," said Kim Addington, vice president of marketing.

### How the mighty has fallen

*Knowledgeware's woes in 1991*

**August**
Reports fourth-quarter record revenue of $40.3 million; announces agreement to aquire Intellicorp.

**September**
President/COO Terry McGowan and Senior Vice President of Finance Don Ellis resign under a cloud.

**October**
Reports first-quarter 1992 loss of $4.9 million, shareholder suits ensue. Intellicorp acquisition is scrapped.

**November**
Lays off 22% of work force.

CW Chart: Janell Genovese

# AT&T adds credence, choices to young frame-relay market

BY JOANIE M. WEXLER
CW STAFF

Users said that while they do not require AT&T's blessing to forge ahead with frame relay, it doesn't hurt that the dominant telecommunications carrier pledged last week to offer the service.

AT&T has officially bundled a frame-relay offering with two other enhanced data services under a newly created product family dubbed "Interspan." AT&T brings up the rear on announcing its plans to deploy frame relay. Its service, slated for release in mid-1992, is expected to arrive in time to match user implementations.

"You bet I'm interested" in increased frame-relay choices, said Lionel Gillerman, manager of network technology at McDonnell Douglas Aerospace Information Services Co. in Cypress, Calif. The firm is testing frame relay in both private and public networks, and "it looks like we'll be able to get high [data] capacity reasonably efficiently," Gillerman said.

Frame relay is the most tangible of the emerging high-speed wide-area technologies; public service is already available from BT North America, Inc., Wiltel and Compuserve, Inc., as are frame-relay interfaces for existing private networking equipment. A faster form of packet switching, frame relay is estimated to squeeze an extra 35% of data traffic into the bandwidth of a 10-router network.

According to William Micklin, manager of the city of San Francisco's telecommunications bureau, "Frame relay already had a stamp of approval, but AT&T'a joining the bandwagon will make it a mainstream product."

AT&T'a second-quarter 1992 general service availability in about 100 U.S. cities will coincide with initial service offerings from MCI Communications Corp. However, it will follow U.S. Sprint Communications Co. market entry by about six months. The up-to-T1 initial speeds match those of AT&T's competitors.

The initial service will be priced on a contractual basis that includes flat-rate options, according to AT&T.

The backbone of the AT&T service will be Stratacom, Inc.'a IPX T1 fast-packet multiplexer. That decision raised a few industry eyebrows in that it usurped AT&T'a own frame-relay-capable but neophyte BNS-2000 switch for the role.

However, Rosemary Cochran, a principal at Vertical Systems Group, a consultancy in Dedham, Mass., viewed using the widely deployed Stratacom equipment as critical to a timely market entry.

The IPX is "proven, and if you're making a decision to enter the market now, you have to deploy it as quickly as possible."

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# Windows opens up DEC client/server to users

BY ELISABETH HORWITT
and SALLY CUSACK
CW STAFF

MAYNARD, Mass. — Partnering with Microsoft Corp. has enabled Digital Equipment Corp. to make its client/server strategy a lot more attractive — to its own customers.

However, even with Microsoft Windows on its team, DEC has a long way to go before it becomes a major player in the network operating system market, according to industry observers and DEC.

Key to DEC's effort is Teamlinks for Pathworks, said to allow Windows applications to directly access services on Ultrix, OS/2 and VAX/VMS servers.

DEC also announced a client/server version of its All-In-1 that is said to allow Windows, DOS and Apple Computer, Inc. Macintosh workstations to access a VAX/VMS All-In-1 host as clients instead of as dumb terminals. The question remains, however, whether the announcements are sufficient to turn the balance in DEC's favor at some multivendor shops.

3M Co., a multivendor shop, uses both Pathworks and Microsoft's LAN Manager but is leaning toward the latter as its primary network operating system, according to lead network analyst Mark Anderson. While Pathworks is based on LAN Manager, Anderson said DEC's version still lacks some LAN Manager functions.

Perhaps the biggest obstacle to Pathworks' popularity relates to DEC's belated decision and limited effort to open up the environment, said Steve Ruger, information systems manager at Smith Industries Corp. in Malvern, Pa. While Pathworks now runs on OS/2 and Ultrix servers, such systems can only serve the local-area network. A VAX/VMS Pathworks server is needed for users to share resources across corporatewide distributed LANs.

This limitation has effectively blocked Smith Industries from moving off its present system — in which all LAN users are served by one VAX host — and providing each work group with its own LAN server running on either Ultrix or VMS, Ruger said. "People keep asking me why we aren't going to departmental computing, and I say, 'I don't want to put a Microvax in every office — it's not terribly cost-efficient.' "

John Rose, DEC group manager, concurred that DEC needs to move Pathworks services beyond the VAX/VMS hosts if it wants to sell its client/server strategy outside its own customer base — particularly to companies that plan to integrate their LANs from the bottom up. DEC plans to evolve its Teamlinks platform to other server platforms and to move All-In-1 services to the OSF/1 Unix platform, he added. No time frame was given.

DEC's client/server environment also gained support from Lotus Development Corp. last week. Lotus announced that it will provide Teamlinks support for the Windows versions of 1-2-3, Ami Pro 2.0, and Freelance Graphics. Availability is scheduled for early 1992.


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# Smart cards hit medical industry

BY MITCH BETTS
CW STAFF

NEW YORK — The federal government's recent call for a paperless health-care system was followed quickly last week by the debut of a "smart card" that would allow consumers to carry their medical records on a plastic card with a 3K-byte memory chip.

The Onecard, introduced by Onecard Health Systems Corp., based here, can be scanned by card readers at hospitals, medical offices and pharmacies, thus providing accurate patient records and eliminating many paper forms. The Onecard record will be updated at each visit.

The announcement came a week after Secretary of Health and Human Services Louis W. Sullivan launched a national campaign to cut administrative costs through technologies such as smart cards and electronic filing of insurance claims. Elie Rabie, president of Onecard, said the card has been under development for three years, so the timing of the announcement was mostly luck.

The system is in beta testing at several New York pharmacies, and a nationwide rollout is expected in 1992, according to Rabie.

Rabie said the company is negotiating with three major insurance carriers to distribute the smart cards to policyholders. However, the biggest challenge is deploying the $100 card readers in thousands of doctors' and dentists' offices nationwide, he said.

Charles J. Singer, a Wakefield, Mass., consultant specializing in health-care information systems, said another big problem is a human one: Patients inevitably forget to carry their smart cards.

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# High-powered vendor forum reveals open systems concerns

BY MARYFRAN JOHNSON
CW STAFF

RESTON, Va. — More users should be talking, more vendors listening and more buying — especially more buying — open systems products.

Those were the boiled-down recommendations resulting from the Industry Power Panel held last week at The User's Open Systems Conference, which was sponsored by the Corporation for Open Systems International.

The forum brought together top officials from IBM, Digital Equipment Corp., Hewlett-Packard Co., NCR Corp., Apple Computer, Inc., Allen-Bradley Co. and The Santa Cruz Operation before a roomful of users wondering where open systems is headed and why the process is so poky.

At the end of the two-hour session, it was panelist Roger Heinen, vice president and general manager at Apple, who best summed up the vendors' views on open systems: "If you want open systems, you must buy them. That's a language we understand." Another panelist, Ellen Hancock, IBM vice president and general manager of networking systems, noted how open systems products may be passed over by users in favor of the tried and true.

Hancock pointed to Open Systems Interconnect (OSI) networking products as a prime example, saying that while IBM is pushing OSI products, customers are demanding older Transmission Control Protocol/Internet Protocol (TCP/IP) network software instead.

"We are not spending money on things customers don't want to buy," Hancock said.

IBM just found out last week that its TCP/IP products are selling faster than OSI products in Europe, which is a noted bastion of OSI, Hancock said at a separate conference last week (see story page 91). One possible reason: IBM's OSI products are approximately twice the price of its TCP products, according to Hancock.

One point all the vendors quickly agreed on was that open systems does not necessarily mean Unix — and it most definitely does not mean MS-DOS. Rather, open systems means standardized interfaces to allow products to interoperate on multivendor networks, leaving them room to innovate and make money on individual products.

Dave Austin, an information systems manager at the U.S. Department of Defense, took the panel to task for being too alliance-crazy. "I'm seeing a lot of alliances put together to sell me stuff," he said. "What I really need is an alliance to help me support the stuff that I've got." That got the biggest applause of the day.

When an audience member asked the panelists to volunteer their support for a merger of the Open Software Foundation and Unix International, they hastily declined.

While they agreed that the failed unity attempt two years ago had retarded development of a standard Unix kernel, several panelists suggested the progress of standardized networking software is swiftly making the underlying operating system a moot point anyway.

Legacy systems and installed bases clearly weighed heavily on the panel's collective mind. "The real hang-up is how to move those current applications and data structures to the new environment," said Lewis Platt, executive vice president at HP.


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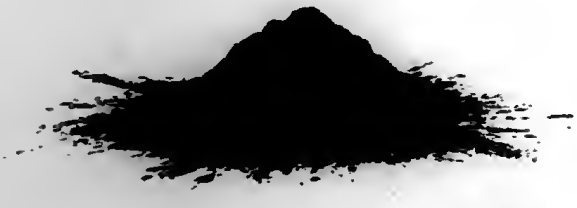

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# Delphax acquires Bull printer lines

BY KIM S. NASH
CW STAFF

WELLESLEY, Mass. — Bull HN Information Systems, Inc. last week sold its high-end line matrix printer operations to a Massachusetts-based printer supplier for $10 million.

Delphax Systems in Canton, Mass., bought the Series 4000 and 5000 lines from Bull Printing Systems (BPS), a unit of Bull HN, based here. BPS will continue to offer its low-end printers and magnatography machines, which are the green-bar paper devices used in data centers, the company said.

Bull will continue to service existing and future Series 4000 and 5000 installations.

The acquisition fills out Delphax's high end and will enable the company to beef up its direct sales force, said Alex Cimochowski, Delphax's president and chief executive officer.

Under the agreement, Delphax will absorb all 60 engineers and salespeople at BPS currently working on the Series 4000 and 5000 lines, which are used in Bull and IBM mainframe shops. These lines contributed $20 million in sales to BPS last year.

Delphax recently diversified its traditional OEM supply path and began selling its products directly to users.

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# V series users await conversion tools

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — The migration plan for users moving from Unisys Corp.'s V series to A series mainframes is still sketchy and lacks important software tools and consulting services.

Source: Computer Intelligence

V series users, however, seem confident that a path to the A series will arrive before the last iteration of the V series' system software is delivered in late 1993. Unisys told V series mainframe customers in July that their platform was being phased out, and the firm would provide a migration path to the A series.

Unisys is still working on planning tools and consulting services designed to assist users in selecting the right size A series, said John Rioux, vice president for A series, V series and System/80 mainframes within Unisys' Computer Systems Group. The tools and services are now squarely in the development phase. Availability is undetermined, he noted.

"By the next user meeting, we will have much more definitive information and hope to have deliverable dates," he said.

Rioux will be held to that statement, said Mark Offenbacher, IS operations manager at Salem, Ore.-based Norpac Foods, Inc. and vice chairman of the V series user group. "Every customer out there will have to decide if it wants to migrate to an A system or to an IBM," he said, adding that Unisys must "have some of the [tools and services] on board" by the next Cube user group conference, slated for April in San Francisco.

Rioux said that Unisys, which will continue to build the V series "as long as there is a demand," sold more V series in the third quarter than in the first and second quarters combined.

"We're satisfied Unisys has a game plan," said Blake Prichard, vice president of the Federal Reserve Bank in Boston and head of an informal V series user group within the six of 12 Federal Reserve regional banks that use Unisys systems.

## Easy does it

**While Unisys Corp. works on moving some V series functionality to the A series, it recommends several preparatory steps users can take to migrate application code and networks:**

- **Implement Link, Unisys' fourth-generation language development system that runs on both the V series and the A series.**
- **Begin using Unisys' Data Management System.**
- **Move to Cobol 74 on the V series, planning a move to Cobol 85 on the A series.**
- **Begin using the CP2000, a front-end processor available for both mainframe lines.**

ELLIS BOOKER

# Little new to show at PC Expo, but attendee count was high

BY MICHAEL FITZGERALD
CW STAFF

CHICAGO — The recession helped drive attendance at this year's PC Expo to record levels, but there were few new products evident.

While the show drew largely from the Great Lakes region, significant numbers of attendees came from Kansas and others from as far as Mississippi.

While many came simply because the show was within driving distance and could be seen in a day, others came because it was the only thing they could cost-justify.

"We're hurtin' for certain, and travel's near nil with money so tight," said Edward Bonney, a programmer/analyst at Jackson Community College in Michigan.

The show also drew numerous information systems professionals from Chicago-area corporations, such as John Chapman, senior technology consultant at Amoco Corp., who said he avoids Comdex because of its size.

A dearth of new products did not disappoint most attendees, who said they came to compare products from different vendors and attend seminars. An 8:45 a.m. session on Microsoft Corp.'s Windows drew 625 people.

However, there were some new products. Houston start-up Notebook Computer Co. announced its 486T-33, a five-pound notebook based on the 33-MHz Intel Corp. I486DX chip. Notebook Computer uses Texas Instruments, Inc.'s Travelmate box and builds its systems into the box.

It includes 4M bytes of random-access memory (expandable to 10M bytes), a 10-in. IBM Video Graphics Array-compatible screen and a 60M-, 80M- or 120M-byte hard drive. The machine will ship in December, with a retail price starting at $5,495.

*Staff Writer Christopher Lindquist contributed to this report.*


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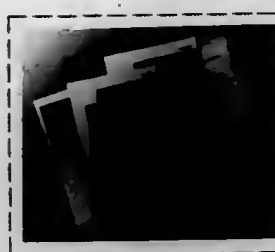

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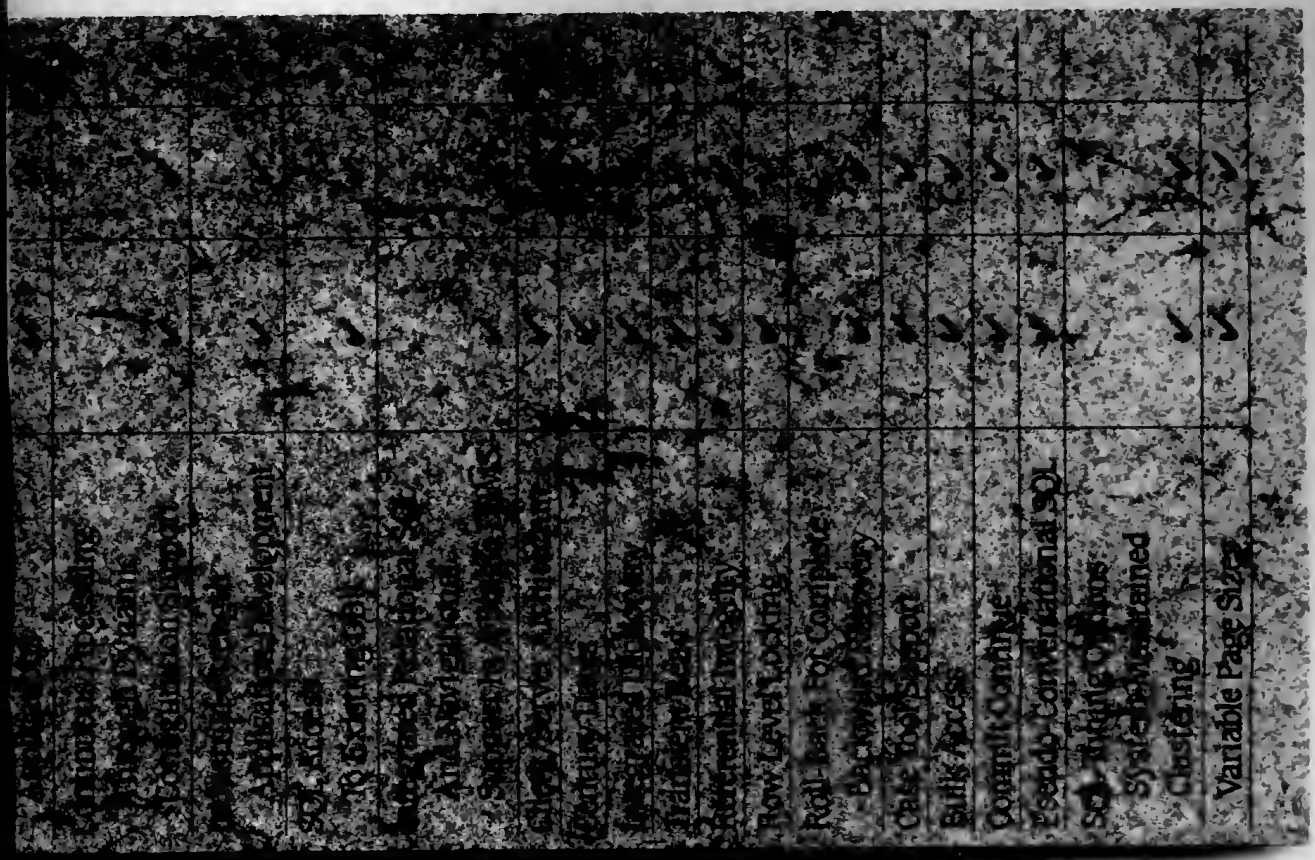


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# ADVANCED TECHNOLOGY

TECH TALK

### Earthshaking computers

■ To learn how seismic activity affects electronic equipment, researchers at the National Center for Earthquake Engineering Research (NCEER) are putting IBM computers on the center's shake table and subjecting them to simulations of moderate and severe earthquakes. NCEER, based at the State University of New York at Buffalo, and IBM are collaborating on a three-year, $1.2 million research program to investigate the effects of earthquakes on computers and how to protect them better.

### Finally, checkmate

■ Lewis Stiller, a 25-year-old graduate student, has solved a long-standing chess problem and has opened the door for analysis that was once thought to be too complicated for even the fastest computers, according to recent news reports. Stiller performed one of the largest computer searches ever and found that a king, a rook and a bishop can defeat a king and two knights in a maximum of 223 moves. The question of whether the combination could win has puzzled chess players for centuries. Stiller, who works in the artificial intelligence laboratory at Johns Hopkins University, solved the problem using a massively parallel processing computer at Los Alamos National Laboratories.

### Pointing all over

■ Gyration, Inc. said that it has developed a unique mobile pointing device that can control the cursor on a computer monitor in real time for two- and three-dimensional software applications, without being dependent on the location or position of the device. The product, called Gyropoint, internally senses motion to the device rather than by means of the contact of a rolling ball to a surface or external sensors. It is compatible with Apple Computer, Inc. Macintoshes and IBM Personal Computers and compatibles.

# Discovering the hidden computer

*Xerox researchers are challenging the idea that computers must be visible tools*

BY CLINTON WILDER
CW STAFF

Researchers in the computer science laboratory at Xerox Corp.'s Palo Alto Research Center (PARC) sometimes wish computers had never been invented — at least not in the form we know them today.

PARC's advanced computer research challenges the premise that the computer is an autonomous piece of equipment. The computer should not sit on the desktop; the desktop should be a computer, the researchers say. Computers should be embedded in walls — or better yet, in square-inch tabs that you carry around in your pocket.

Such computer prototypes are actually up and running at PARC, Xerox's fabled research center tucked among the horse farms and rolling hills of the San Francisco Bay peninsula. PARC researchers envision a 21st century with what they call "ubiquitous computing" — where rooms may contain hundreds of computers, without a keyboard, cable or CRT in sight.

"When we originated the [ubiquitous computing] concept about three years ago, we asked how we could make computers really respond to human needs," said Mark Weiser, a genial, bearded former computer science professor who heads the computer science lab. "We wanted to do everything we could to take a fresh look at computing and to start again from scratch."

> "WE WANTED TO do everything we could to take a fresh look at computing and to start again from scratch."
>
> MARK WEISER
> XEROX PALO ALTO RESEARCH CENTER

(Photo by Brian Thomsen [illegible] with permission from Xerox Corp.)

**PARC researcher Mark Weiser** *displays a high-tech blackboard, which allows a penlike input device to act as a 'wireless mouse' or 'electronic chalk'*

### A look into the future

Weiser and a research team of about 10 people have developed a futuristic, three-tier architecture that bears little resemblance to mainframes, midrange systems or personal computers. The computer prototypes at PARC are known as boards, pads and tabs.

A board is a high-tech version of a marketing representative's favorite tools: the white wallboard and the Magic Marker. But a PARC board user does not have to touch the board. An infrared camera embedded in the tip of the penlike input device acts as a "wireless mouse" or "electronic chalk" that can write or manipulate data on the board, according to Weiser.

The boards, which contain either a Sun Microsystems, Inc. workstation or IBM-compatible PC, use Go Corp.'s pen-based operating system.

Pads, which resemble large laptop computers without the keyboard, each contain a Motorola, Inc. 68000 series and 34010 microprocessor. "We want to use existing components as much as possible" to speed commercialization of the technology, Weiser said. The pad stores data input with an attached stylus on a built-in 4M-byte hard disk. Both the board and the pad have screens with 1,024- by 768-pixel resolution.

Perhaps PARC's most exciting invention in this smaller-is-better computing era is the tab. Measuring 2¾- by 3¼-in., a tab contains a Philips Corp./Signetics, Inc. 8051 microprocessor, a chip commonly used in industrial control devices. But the tab's application is anything but standard: PARC researchers wear them as electronic badges.

From embedded diodes, the badges send infrared signals to radio transceivers located throughout the building. Employees can locate one another at all times and forward telephone calls automatically to the room where a person is (the phone rings with a personalized musical jingle for each employee).

Another type of tab includes a tiny icon-based screen on which users run simple applications such as electronic mail, calendaring and even a Lilliputian version of the Pong video game. The applications run on a Sun Sparcstation, linked to the tab by wireless infrared signals at 240K bit/sec. Weiser calls them "Post-it Note computers."

"Ultimately, we'd like to see these sold in supermarkets," Weiser said. "You could pick up a 10-pack of computers and a loaf of bread."

The wireless communication is one of the biggest technology hurdles to real implementation of ubiquitous computing. Transmission Control Protocol/Internet Protocol "is becoming more and more of a standard protocol, but it has serious problems when you get into mobile communications," researcher Rich Gold said.

### Regulatory concerns

Weiser noted that new forms of wireless communications must be approved and regulated by the Federal Communications Commission.

"Because [ubiquitous computing] involves breaking existing structures, I would say it's at least 10 years away from real use," Weiser said.

Motorola and IBM's "cellular devices raise FCC issues with a few hundred per city at 4.8K bit/sec. We're talking about having several hundred computers in a single room at 240K bit/sec.," Weiser added.

The lab's goal is to have between 20 and 50 of each type of computer operating at PARC by the end of 1992. Weiser emphasized that the technology is very much in its infancy. For example, it lacks a scalable operating system for all three platforms. The real application of ubiquitous computing is very much a clean slate — or pad.

"The PARC approach is to live your research," Weiser said. "Next year, we hope to have the infrastructure in place. Then we can start to find out all the things we did wrong — what we have and what we don't."

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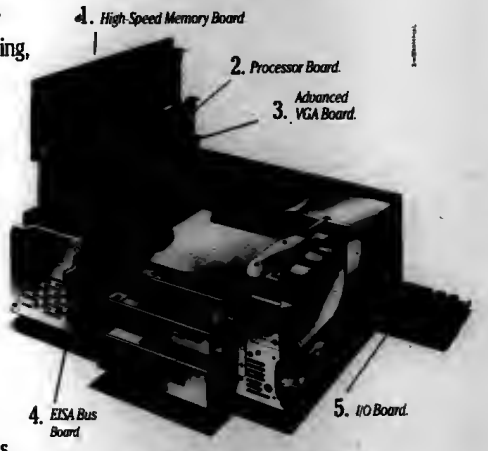


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## EDITORIAL

# Coming up dry

*Men at some time are masters of their fates.*
— William Shakespeare, *Julius Caesar*

Last year around this time, the Boston Red Sox went out and spent like drunken sailors in the free agent market to buy some pitching and hitting.

The team sought a competitive advantage over the other major league teams, which, by their efforts, had kept the Sox from winning a World Series for 72 years.

Make that 73 years now. The promising and very expensive arms they bought didn't produce many victories, and the big hitters couldn't hit when it mattered. Fans were incensed. All that money and little if anything to show for it.

As an IS professional, you are part of a group that will spend about $1 of every $2 spent on capital equipment in the U.S. this year.

Know what? By any conventional measurement, that expenditure, which will total close to $200 billion, is not increasing productivity. What's worse, the application of information technology in some instances has resulted in decreases in productivity.

Amazing, you might think. Nonsense, you likely say.

But the fact is that in the current weak economic climate, this "cash drain, no gain" thesis is being scrutinized very carefully by an emerging breed of slash-and-burn CEOs and other corporate captains.

In today's issue of *Computerworld*, beginning on page 69, Harvard Professor Gary Loveman outlines this productivity dilemma in all its gory detail. At least, it seems gory at first glance. This is one of the more provocative articles we have published.

As Loveman demonstrates, the IS community is facing a clear and present danger as corporate America struggles in the global market. What corporate leaders wanted from the prodigious investments their companies made in IS was competitive advantage resulting from productivity gains. After all, we have been outspending our European and Japanese corporate counterparts about 2-to-1 in the information technology department. So where's the payoff?

While the professor maintains that the productivity dilemma is not necessarily the fault of IS managers, it is clear that those managers have a significant, if not leading, role to play in fixing this problem. As he outlines, there is a host of vital yet pragmatic steps that IS professionals must take, which, in sum, "are subsidiary to the profound reconsideration of the role that information plays in the organization."

Sports fans in Boston know the Red Sox will continue to spend and spend — in vain. Then they'll shrug their shoulders and say that it's only a game.

For you, getting a more measurable bang for the information technology buck is not fun and games. It is the most serious challenge of the 1990s and, as such, holds the greatest opportunity for IS professionals.

## LETTERS TO THE EDITOR

### HP credit

"VAX 6000 tops list in user satisfaction poll" [CW, Oct. 7] was in several ways an unfair representation of the Hewlett-Packard Co. 3000.

As you showed, with the HP 3000 receiving an overall satisfaction rating of 4.33 and the VAX 6000 receiving a 4.34, the two systems effectively tied for first place in Datapro Research Corp.'s 1991 Midrange User Ratings Survey. In addition, the HP 3000 was the only system to win special merit awards, which require from every respondent a score no lower than 4.0 (on a five-point scale).

While you mentioned that the HP 3000 won a special merit award for service and support, I would like to point out two additional special merit awards won by the HP 3000: system reliability and price/performance ratio. In fact, HP 3000 users rated our system reliability at 4.85.

*Rich Sevcik*
*Commercial Systems Division*
*Hewlett-Packard Co.*
*Cupertino, Calif.*

### Leasing lawsuits

"Don't mess with what isn't yours" [CW, Nov. 4] shows a lack of serious understanding of the issues.

The article suggests there are two lawsuits (between IBM and Comdisco, Inc.) over related issues. In fact, the lawsuits are totally unrelated. One involves reconfiguring IBM Credit Corp. (ICC) subleased machines; the other entails installing modified IBM parts in IBM machines without the knowledge of all the involved parties.

ICC's position on the return of the exact same parts that were in the original lessee's machine makes it economically impractical for a third-party lessor to reconfigure a machine to meet a sublessee's needs. The lessee needs to find a solution with ICC that results in the account control that IBM is after. The ICC lessee is the loser.

As for the modified parts, they may work perfectly well, but all parties concerned should be informed. IBM could legitimately decide not to maintain them.

ICC's current lease terms and conditions offer third-party lessors the opportunity to differentiate themselves and compete on other than lease rates. Step one will be to inform lessees of the issues and how those issues may affect them.

*Harry R. Miller*
*Miller Information*
*Processing Services Corp.*
*Syracuse, N.Y.*

### Help the help desk

In "Help desk staff search hurt by low pay" [CW, Nov. 11], you write how difficult it is to find good, patient and technically trained people to operate a help desk. The reasons cited are low pay and lack of prestige.

These shortages exist because most people have the same attitude expressed in "Hello, help desk? HELP!," which appeared in the same issue: that qualified help desk staff members "free up more valuable IS employees for more important tasks."

How are help desks supposed to get the support they need from management to employ qualified people when stories give the impression that the staff members at a help desk are not doing an important and valuable job for their company?

*Margaret Fuquea*
*McCutchen, Doyle,*
*Brown & Enersen*
*San Francisco*

### AI assistance

Your Nov. 11 Executive Report on help desks missed a key ingredient.

Artificial intelligence is playing an increasingly critical role in most of the new help desks that are evolving. AI makes it possible for these systems to cope with the huge amounts of disparate data required in real time.

Case histories made the point at our national conferences this year. Digital Equipment Corp.'s Canasta Help Desk report noted that "average time for handling crash-related calls has decreased . . . collecting symptoms in less than three minutes for most crashes with greater accuracy than most engineers."

They compared this three-minute time to the 30-minute average on non-AI systems.

It is the use of AI techniques in these systems that makes it possible to achieve these results.

*Pat Hayes*
*President*
*American Association for*
*Artificial Intelligence*
*Menlo Park, Calif.*

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

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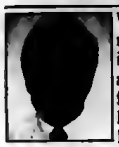
MICHAEL COHN



Working in information systems isn't pretty. It's a grueling, painful, dangerous lifestyle, and we IS folks are one tough bunch.

You don't believe it? Well, maybe we're a little short on tattoos. And maybe we can't boast many on-the-job scars, but get a bunch of us old-timers around a lunch table and we'll tell you some tales about just how wild and woolly things can get in this line of work.

Of course, if you're going to join us, you have to fit in. Here are some of the things you'll have to talk about, if you want to be accepted by this tough bunch:

• **The age of the equipment you first worked on.** Tough ISers worked on the 6606 or the 1313 or some other strange four-digit number that was built before they were born. To hear them tell it, this stuff was so old, it was made from fired bronze and hammered in caves . . . so old that it ran without electricity and to keep it cool they just left it outside in the snow.

• **The long hours you've had to work.** Sixteen-hour shifts are for kids. If you're tough, you work day and night. All week. You never go home. Your boss needs to see you on Thursday in the same clothes you were wearing Tuesday.

• **How many weekends you've had to work.** Not just weekends but consecutive weekends. You can't have had a Saturday or Sunday off in 13 years, except maybe for one Easter back in 1981, when you brought the kids to the office and made them hunt for Easter eggs under the raised floor.

Scott Matthews

• **The longest job you ever ran.** No fair counting logic loops. We're talking big time, month-end, number-crunching monsters that ran for days and called for 44 tape mounts. In fact, if you really want anyone to pay attention, you'd better have one that dimmed the lights and sucked the electricity out of neighboring buildings.

• **How much paper it takes to print your jobs.** Tough ISers kill trees. You want to print stacks that take six or seven people to carry. Any rookie can print 20,000-line reports. But you're tough if you produce a dump that wears out two or three printer ribbons, and you're really tough if you then go and microfiche the whole thing.

• **The huge staff you used to manage.** Big staffs are a big deal. Whether they're data entry, developers or database administrators, managing a staff of 50 is a lot tougher than managing a staff of 15 . . . no matter how poorly you do it. In fact, I knew a manager who had a staff of 50 people and mismanaged them into a staff of 15. But be was tough.

• **How many lines of code your systems average.** Tough programmers maintain millions of lines of code. They fill entire walls with pages of listings. It doesn't matter if the code is garbage. It doesn't matter if the stuff never even compiles. Whoever said, "Garbage in, garbage out," was a wimp. If you have enough garbage in, then you are tough.

• **Your longest project.** Don't even discuss a six-month project. Everyone's been on a six-month project. I was on a six-month project for three years. But if you're in the middle of an eight-year project, then you're probably pretty tough . . . even if it turns out to be a four-year project that you had to do over again.

• **The size of your budget.** Size is everything. A $10 million IS budget is much tougher than a $2 million IS budget, even if you overspent or misspent or spent it all doing a four-year project over again.

• **How many phone-mail messages you just got.** If you take a day off and come back to three messages, you're chopped liver. But if you tell everyone that while you were in the bathroom, you got eight messages, or that when you returned from vacation, you had 30 messages, then you are incredibly tough. Just don't tell them that 28 of them were from your mother.

*Cohn works for a very large computer company in Atlanta.*

# Don't let yourself be misled by analyst bias

EFREM G. MALLACH

Weather forecasters make mistakes, but we still wear galoshes when they say it will rain. Computer industry forecasters are probably more frequently wrong in their projections, but that's not to say they can't be useful in their own fashion. The advantage with computer industry analysts is that they are consistently wrong in the same direction. They overestimate the speed with which new developments will replace the tried and true.

As long as we read technology or product growth forecasts with certain distortion factors in mind, it is possible to draw some fairly accurate conclusions about the prospects for whatever it is that the analysts are saying will grow XX percent by the year Z.

The three factors that make analysts anticipate faster change than will really occur are their own biases, survey subject biases and misleading comparisons.

Bias arises because industry analysts have an economic ax to grind. Most analysts do not consciously fudge their numbers, but they do give them the most favorable interpretation. Why? Because reports about products or technologies that are important and central to the computer industry sell better than reports about marginal products and long/short technologies.

Although the motivation may be less apparent with generic reports that discuss overall industry trends, self-interest is still a factor. People need more industry advice in times of rapid change, so it is in the economic interest of such advisers to predict rapid changes.

Survey subject bias influences the numbers analysts use. Many market forecasts are based on what information systems managers tell researchers about when they will be buying a specific technology or what they expect to be using over the next few years. IS managers are human, too. They want to be seen as state-of-the-art people who use the latest technologies. It doesn't matter whether the survey is anonymous. They can't admit, even to themselves, that their shop might be falling behind.

The facts of the matter, of course, are quite different. The IS manager who says, "Oh, yes, we'll be using Unix next year," often means, "We'll get a Banyan Vines server," or "One of our engineers will have a Sun workstation," while the corporate IS shop sticks to MVS. A respondent's, "We're using multimedia," often really translates to, "We've learned how to put clip art on overhead slides."

Misleading comparisons result from comparing the R&D promise of a new technology with available commercial products.

Veterans may remember how many years semiconductor technology was "around the corner" as a replacement for core memory. It did replace core eventually, of course. Nobody has bought core memory for more than a decade. But the switch took far longer than gurus thought it would. They forgot that during the years that it takes a new product to emerge, the previous technology will not stand still.

Since then, scads of other products have been in the same boat. ISDN is a good example. Many of the benefits that were trumpeted for Integrated Services Digital Network (ISDN) when it was conceived years ago can now be had more simply and less expensively via other approaches, such as fractional T1. Older telecommunications techniques didn't stop evolving while ISDN got its act together. The theoretical maximum speed of dial-up phone lines when ISDN first became the subject of discussion was 2,400 bit/sec.; today they're at 14.4K bit/sec. and counting.

ISDN may still have a future, but it won't be as dramatic and as universal an improvement over the alternatives as it once was. The same is true of just about any other technology — pen-based computing, object-oriented databases and so on — that you are reading projections about now. They may make it to the mainstream, but the event will almost surely occur later than the analysts are saying and represent less of a leap from new versions of the technologies we are using today.

*Mallach is an industry consultant and a faculty member of the College of Management at the University of Massachusetts at Lowell.*

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To help you build on DB2, BMC has developed a blueprint of the DB2 environment in an informative poster, "DB2 — The COMPLETE Picture." For a free poster, more information, or to start a 30-Day-Plus Free Trial of UNLOAD PLUS or any of BMC's other DB2 products, send your request by fax to 713 242-6523 or call BMC toll free at **1 800 841-2031.**

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NEW DEALS

## SHL nabs appeals board deal

**The California Unemployment Insurance Appeals Board** has contracted **SHL Systemhouse, Inc.** in Sacramento, Calif., to design a client/server, workstation-based system for case tracking. The five-year agreement, which is valued at $2.5 million, calls for Systemhouse to convert the appeals board's present Cobol-based system to a personal computer network configuration.

**Crowley Maritime Corp.**, based in Oakland, Calif., recently purchased one of **Hitachi Data Systems Corp.'s** HDS EX 420 mainframe computers. The system was installed in Crowley's San Francisco-based data processing center and will process all of Crowley's business applications. Crowley Maritime offers cargo-liner services throughout the Western Hemisphere. HDS is also enjoying some recent success in Scandinavian countries, where L. M. Ericsson Data Services AB has installed two HDS EX 420 mainframes.

**Okidata Corp.** has signed a $250,000 agreement with **Unisys Corp.** for two Unisys U6000/65 Unix-based systems, as well as Unisys Mapper computer-aided software engineering/fourth-generation language software development tools.

**The MacNeal-Schwendler Corp.**, a leading developer of finite element analysis software, has ordered a Cray Y-MP EL system from **Cray Research, Inc.** The two-processor machine, with 256M bytes of central memory, will be installed in the first quarter of 1992 as the main software development platform at the company's subsidiary in Gouda, the Netherlands.

# AS/400 users stay upbeat on D series

*Still too soon to tell if System/36, 38 users will migrate to Model Ds, but current users are pleased*

ANALYSIS

BY SALLY CUSACK
CW STAFF

IBM's Application System/400 D models may not be coaxing overwhelming numbers of existing System/36 and 38 customers into the fold, but users who have installed the new systems are pleased with the increased capabilities the D series offers.

Debuting last April, the D series offered performance increases of 30% to 60% and price cuts of 10% to 40% from the previously available AS/400 B models [CW, April 29].

The vendor is depending on the installed base of System/36 and 38 customers — estimated at more than 100,000 sites — for a large share of migration installations in the next few years.

**Price no deterrent**

While it is too soon to predict IBM's ultimate success in capturing the System/36 and 38 base, Model D users are enthusiastic. Most are not bothered by the Model D's slightly higher cost of ownership when compared with other leading mid-range offerings (see chart).

"We are very satisfied, and management is very satisfied," said Lawrence C. Cole, vice president of MIS at the Great Bay Hotel Casino in Atlantic City, N.J.

The company has replaced several AS/400 B models with two dual-processor, top-of-the-line D80s. One is responsible for all casino, floor and hotel operations, as well as marketing activities. The other runs a weekly payroll for 3,500 employees.

Cole said he has picked up 80% capacity improvement since installing the new systems.

Tiffany & Co., headquartered in New York, is using a Model D80 for all its production applications. Robert W. Davidson, vice president of MIS at the jewelry firm, said he has nothing but praise for both the system and the IBM service.

Davidson said he is not concerned about the proprietary nature of the AS/400 machines: "You use Unix when you have a lot of different vendors. We are IBM standard. We've stuck with IBM because of the service. No one else can match them."

Steve Backe, systems development manager at Porsche Cars North America, Inc. in Reno, Nev., said Porsche upgraded from a B60 to a D60 in the early fall. So far, the car manufacturer has achieved a significant performance improvement.

In addition to running nighttime batch jobs in one-third the time, Backe said, the Version 2 Release 1 of the OS/400 operating system offers "great [application programming interface] support and the opportunity to write faster utility programs."

Royal Caribbean Cruises Ltd. in Miami recently upgraded from a B70 environment to a dual D80 installation.

The new systems, which are linked via 16M-bit Token Ring, are responsible for passenger services, reservation systems, airline ticketing information and passenger level accounting applications.

"The product has a clean touch and feel to the applications people," said Ronald W. Sieman, vice president of information technology.

"We don't need to establish separate groups to learn separate pieces of what the machine can do — it's very easy to run."

Sieman said he is also pleased with the system's communications capabilities. The D80s interface with Unix boxes via Transmission Control Protocol/Internet Protocol and operate over an X.25 network.

Not all potential converts to the D models are as enthusiastic, however.

Michael J. O'Hara, director of information systems for Rockingham County, Va., said his department is currently evaluating several alternatives — including Unix — to supplement its B40.

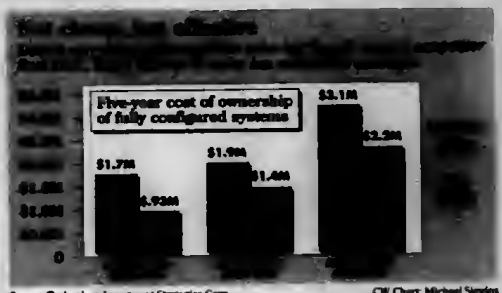
Two and a half years ago, the county moved from an "overloaded 36" immediately onto the AS/400, O'Hara said.

"When the installation was done, IBM assured us that this would be a five-year platform, assuming a normal growth path," he said. The cost was approximately $150,000.

According to O'Hara, the systems required substantial random-access memory and direct-access storage device increases as well as tape additions, and the county now has a $300,000 investment in a box it felt would last three years with minimal upgrade. An upgrade to a D40 would cost an additional $50,000, he added.

"The AS/400 is a black hole; we have to keep throwing money into it to stand in place," O'Hara said.

The system runs the county's integrated financials, maintains on-line records indexes for the clerk of courts and handles real estate appraisals as well as personal property tax systems.




Source: Technology Investment Strategies Corp. CW Chart: Michael Siggins

## Coming attractions

According to Robert J. LaBant, vice president and general manager of IBM's Application Business Systems, users can expect IBM to deliver continued price/performance upgrades in the AS/400 line. More specifically, he promised the following enhancements will be available to customers:

- Delivery of a three-way processor by mid-1992.
- CICS on the AS/400 by late 1992.
- Posix support.
- Support for the Open Software Foundation's Distributed Computing Environment.

*IBM's LaBant promises AS/400 enhancements*

# New systems carry great expectations

BY SALLY CUSACK
CW STAFF

Analysts agree that the D models are a good solid hit by anyone's standards.

David Andrews, managing partner at ADM Consulting, Inc., Application System/400 specialists in Cheshire, Conn., predicted a worldwide installed base of between 40,000 and 45,000 systems by year's end.

"We've also seen a pickup in the rate of S/36 and S/38 migration — sort of from slow to medium-slow, but a pickup, nonetheless," Andrews said, adding that the number of migrations to the AS/400 platform will increase by 30% to 40% over last year.

**Another popular model**

"We expect that the Ds will be as popular as previous models," said Steve Josselyn, senior analyst at International Data Corp. (IDC), a market research firm based in Framingham, Mass.

As of year-end 1990, IDC figures showed there were 110,000 AS/400 installations worldwide.

It is also expected that the entry-level D2 workstations, announced in September with a $12,000 entry price point, will increase IBM's volume sales.

Andrews noted that IBM could expect downsized migration from its mainframe customers as well.

Georgia-Pacific Corp. in Atlanta, Harley-Davidson Motor Co. and Pepperidge Farm are IBM customers that have already opted to trade in their big iron for the smaller systems.

The AS/400 currently accounts for $14 billion of IBM's revenue.

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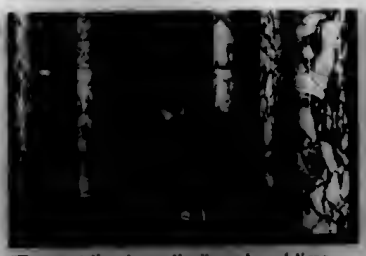
**Mark Quinlan**
**Senior Programmer/Analyst**
**Huntington National Bank**



"To meet the dramatically reduced time-to-market requirements for our products, we need high-quality systems that can be changed fast. That's why we've chosen the IEF as the CASE solution for our entire organization."

**John Pajak**
**Executive Vice President**
**Mass Mutual Life Insurance**

"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

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**Chief Technology Officer**
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"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

**John F. Mott**
**President**
**AMR Travel Services**

"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

**Giorgio Serani**
**Division Head – MIS**
**Lubrizol**

"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development.."

**Wal Budzynski**
**Head of Operations, Systems/Computing**
**Rolls-Royce**

"The IEF offers dramatic improvements in productivity, yet it's easy to learn. One example: We trained 23 developers, including 18 new hires, and then completed a large order processing system—300 transactions—all in only 20 months."

**Venkat (Vinnie) Tiruvilvamala**
**Director, CPC/CPPC Information Systems**
**SONY Corporation**

"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

**Mogens Sorensen**
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**Study shows zero code defects.**

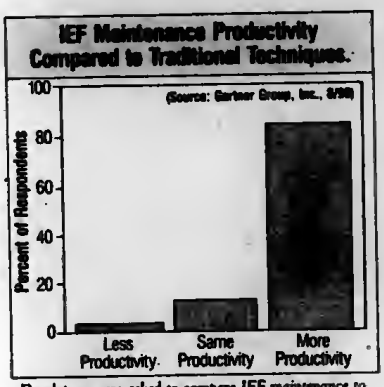
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) *IEF developers reported zero defects—not one abend had occurred in IEF-generated code.*

**Maintenance productivity gains of up to 10-to-1.**

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

**Specifications always match the executing application.**

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.




*Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.*

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With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

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The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will follow. We are committed to increased environmental independence in support of the Open Systems concept.

**We are committed to standards.**

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's COHESION—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

**Full-service support.**

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

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you develop a
, the world listens.

# Users' role grows in X/Open's effort to expand open systems

BY MARYFRAN JOHNSON
CW STAFF

RESTON, Va. — The sound might have been more cacophony than chorus, but the voices of users were raised to a powerful pitch at the recent X/Open Consortium Ltd.'s World Congress on Open Systems.

Only a few months into its metamorphosis from a vendor-driven group to a user-oriented organization, X/Open officials made a point of inviting folks from 15 other Unix user groups to attend the conference, held two weeks ago, to grapple with questions on everything from graphical user interfaces (GUI) to mainframe data access in multivendor environments.

"They are taking us more seriously," said Dan DiLuzio, business director of information technology at Kodak Park, a film manufacturing division of Eastman Kodak Co. in Rochester, N.Y. "That's the first time they've made such an effort."

Earlier this fall, X/Open announced its intent to realign itself more closely with users and software developers to provide a "more effective forum" for all segments of the industry. "It's not our intention to hand the whole organization to users, but open systems do need a more bipartisan view," said George Shaffner, chief operating officer at X/Open.

X/Open

X/Open's core mission — to expand the market for open systems — remains unchanged, Shaffner stressed.

"This is a very critical juncture for X/Open," said Judith Hurwitz, an analyst at Patricia Seybold's Office Computing Group in Boston. She noted how the loss of million-dollar dues-paying vendor members, such as the Open Software Foundation (OSF), and the mergers and declines of some systems vendors, has translated into a "major loss of revenue" for X/Open. "The reality is that without a dramatic about-face, X/Open won't be considered relevant," she said.

DiLuzio said that in his six months on X/Open's user council, he has noticed the organization turning an increasingly attentive ear to what the 40 council members have to say. The council includes big technology spenders such as Amoco Corp., The Boeing Co., Daimler-Benz AG, Du Pont Co., McDonnell Douglas Corp. and Texaco, Inc.

"One thing I like about the X/Open group is they are independent of any particular corporation in the industry," said Bill Keatley, a management specialist at American Airlines' Sabre Travel Information Network in Fort Worth, Texas.

Jerry L. Johnson, a standards analyst at the Texas Department of Information Resources in Austin, Texas, said a dramatic change is under way as "users are getting very proactive."

Texas is spending $1.4 billion in its current two-year budget on the information systems needs of its 250 state agencies. The state recently began its 10-year migration to open systems with the installation of IBM RISC System/6000s at one state agency and Unisys Corp. Unix systems at another.

*Shaffner says X/Open's mission remains unchanged*

Johnson and other users said X/Open needs to develop a cooperative working relationship with other prominent open systems groups, notably The Corporation for Open Systems International.

"The last thing we can afford . . . is duplication of efforts," Johnson emphasized. "We need to identify the voids where standards and products are needed, and if this is a collective effort, then various groups around the world can pick up this or that piece and work on it."

Users spent much of the three-day meeting closeted in work groups, addressing issues such as security, system and network management and GUIs. Each of the six groups submitted a list of five action items to X/Open officials for inclusion in the "Open Systems Directive," a publicly available report due out in January.

One of those items urged X/Open to take a more active role in establishing a common user interface — one that somehow combines the best qualities of Microsoft Corp.'s Windows, OSF's Motif, Sun Microsystems, Inc.'s Open Look, IBM's Presentation Manager and Apple Computer, Inc.'s Macintosh.

Another suggestion highlighted the need to develop a step-by-step guide for companies considering a move from proprietary to open systems.

# Informix 5.0 to feature parallel processing

BY JEAN S. BOZMAN
CW STAFF

Informix Corp.'s forthcoming Informix 5.0 relational database will support parallel processing when it debuts next month, the company confirmed recently.

The supporting feature, parallel data query (PDQ), will initially be available only for Sequent Computer Systems, Inc. computers. Sequent and Informix collaborated on designing PDQ for nearly two years. Informix will make the PDQ technology available to other vendors in late 1992, the company said.

PDQ will provide two key features — parallel sort and multiple concurrent threads — when it is delivered in the first quarter of 1992. A second release will add parallel scan and parallel join functions within a year to 18 months of the first PDQ shipments, Informix said.

Tim Shetler, director of product marketing at Informix, said PDQ will allow end users to conduct complex queries against a large relational database management system containing many thousands of rows of data. "We want to enable users to do those long queries that today are being prohibited by IS due to slow response times," he said. Often, users must use preprogrammed queries, or standard report forms, when firing SQL queries at large RDBMSs.

Some Informix users are aware of the future PDQ option. "Some of PDQ's parallel sort features are already in Informix Online 4.1," said Mark Chandler, database administrator for the city of Seattle Municipal Court, which uses a Sequent Symmetry 2000 computer running Informix as its host system. "If we get PDQ, we could run our current applications without any change at all, and our queries would be spread across multiple CPUs."

PDQ is seen as a way to boost RDBMS throughput by 10 to 40 times. In theory, complex queries would be broken down into simpler components and mapped against a set of CPUs; the results of the parallel queries would then be joined together in disk memory for user retrieval. Sequent's multiple CPU architecture, based on many Intel Corp. 80386 or 1486 chips, is suited to such parallel processing solutions, a Sequent official said.

PDQ will be similar in some respects to Sybase, Inc.'s SQL Server 4.8. For example, both support multiple user queries through a multithreaded database server, Shetler said. However, any systems vendor trying to use Informix's PDQ technology would have to optimize the feature for use on that vendor's machines, be noted.

# Mennen steps up to the bleeding edge

ON SITE

BY JOHANNA AMBROSIO
CW STAFF

The Mennen Co. was not a likely choice to be the first in the U.S. to install one of IBM's new low-end mainframe models. Nor would a betting person have wagered that the company would install a new operating system version and new tape cartridges at the same time.

"We're usually what I call an 'alert follower,'" said Gene Pinadella, vice president of business systems at the Morristown, N.J.-based consumer products firm, whose name-brands include Speed Stick, Skin Bracer and Baby Magic. "We're not a large company, so we're much more comfortable staying a step or two behind and letting someone else take the risks."

But it chanced the bleeding edge. "This was an opportunity we couldn't refuse," Pinadella said. "It was a bit of a gamble, but it's paid off." The chance was worth taking since it has wound up not costing any more than the old system did.

**Getting results**

Results so far have included a two-thirds power reduction over the old computer and direct-access storage device (DASD) set-up and the installation of technology that will drive Mennen's business for the next decade and beyond, Pinadella said.

Mennen's odyssey began in 1989, when its information systems staff, now some 45 strong, realized its old 4381 with MVS/SP was running out of gas. "It was too big a jump to go from that to a 3090, and we'd heard along with most industry watchers that IBM was getting ready to introduce a new generation of lower end computers," Pinadella said. "So we decided to wait, and we went to a 3081 as an interim machine." The IBM 3081 ran under MVS/XA.

Looking at other systems was never an option, Pinadella said. "All our software was written for an IBM environment, and moving to a new vendor's machine would have required a massive conversion effort."

Instead, the company was counting on the new generation of IBM machines to allow it to get to an Enterprise Systems Architecture (ESA) environment at a price it could afford, he said, and when the Enterprise System/9000s were announced in September 1990, Mennen jumped. The company installed an air-cooled Model 190, the smallest of the new generation, in April 1991.

"ESA became important to us as a foundation for our technology going forward," Pinadella said. Mennen went into production with MVS/ESA 4.2 in July after a three-month upgrade effort that allowed applications to run unchanged.

This foundation also includes IBM DB2, which Mennen installed in June 1990, and a new tape cartridge system, which uses 4-in. cartridges that can store up to six times the information that could be kept on the previous 10½-in. reels. In a period of about six months, Mennen had replaced virtually all of the equipment in its computer room.

**No greater cost**

The firm did it with virtually no increase in cost, Pinadella said. He declined to disclose specifics but said the entire new setup — computer, DASD and operating system — worked out to be the same amount of money it had been paying for the old gear.

"We had a specific budget for 1991, which we had done the year before when we weren't really sure about when or if IBM would come out with the ES/9000s," Pinadella said. "We were able to take advantage of the savings in power consumption and pay what we were paying already for the lease and maintenance on the older equipment."

Although Mennen is paying slightly more for hardware costs, the company is realizing software savings.

By year's end, Mennen plans to install IBM's Enterprise System Connection (Escon) architecture, and here the company is taking a more traditional approach. "We've got the Escon channels installed in the CPU and just about everything is set to go," Pinadella said, "but we are waiting for the [software] to be tested by someone else."

# Fujitsu, citing U.S. pressure, won't donate supercomputer

BY CLINTON WILDER
CW STAFF

Processing needs have taken a backseat to politics, and scientists researching global warming may be worse off for it.

Fujitsu Ltd.'s decision last week to give in to U.S. government opposition and not donate a supercomputer to a global warming research consortium has sent researchers back to the drawing board for ways to meet their computing needs.

The Model Evaluation Consortium for Climate Assessment (MECCA) had welcomed the Fujitsu offer because its current system, a leased dual-processor Cray Research, Inc. Y-MP with 128G bytes of memory, is running at nearly full capacity.

However, U.S. Rep. Richard Gephardt (D-Mo.), a leading critic of Pacific Rim trade practices, wrote to the Japanese Embassy and to presidential science advisor Alan Bromley to oppose the donation. U.S. government officials and U.S. supercomputer vendors have criticized such donations in the past for giving Japanese vendors an unfair entry into the U.S. market.

Chuck Hakkarinen, MECCA project manager at the Electric Power Research Institute (EPRI) in Palo Alto, Calif., disagreed. "We thought they were making a good faith offer to what is really an international, not just American, research consortium.

"Sure it might help future sales, but there's no guarantee for them. If the computer did a lousy job, I'm sure that word would get around, too," Hakkarinen said.

### More to accomplish

The Fujitsu donation, he added, "would have meant a lot more work that we could have accomplished," he added.

EPRI and research organizations from Japan, France and Italy formed MECCA to study global climate change at the National Center for Atmospheric Research in Boulder, Colo.

MECCA members in Japan went to Japanese computer vendors to seek financial support when it became clear that the Cray Y-MP's capacity would need to be augmented, according to Hakkarinen. Fujitsu offered to donate its VP-2600 computer instead.

"We're averaging more than 90% utilization on a daily basis," Hakkarinen said. MECCA will continue to look for other sponsors for additional computing capacity, he added.

The researchers run huge global climate software models that require the power and storage of supercomputers. By collecting data from tracking stations around the world, researchers said they hope to draw conclusions about the extent of global warming and other climate changes.

# Teradata seeks to boost IS appeal

BY JEAN S. BOZMAN
CW STAFF

EL SEGUNDO, Calif. — In a move toward an open systems strategy, Teradata Corp., which makes large dedicated database machines, has designed software gateways to other relational database systems.

At the same time, it announced support for four new hardware platforms that can act as clients to Teradata's proprietary database server.

The moves came as Teradata seeks to broaden its appeal to information systems shops that have not installed the multimillion-dollar DBC/1012 database computer. "We want to fit with the user site's LANs and with their PC tools, such as Lotus Development Corp.'s 1-2-3 and Borland International, Inc.'s Paradox," said Dick Voorhees, senior manager for data access and connectivity products at Teradata.

### Demanding direct access

Even within Teradata's customer base of more than 200 sites, PC users are demanding direct access to the Teradata machine in place of routing their database queries through an attached IBM mainframe. "It's usually an issue of data ownership," Voorhees said. "End users would like to get directly at that database, rather than having to send a request across the network and tapping on the door of the mainframe in the sky."

Teradata now supports software gateways from Micro Decisionware, Inc., Oracle Corp.'s SQL*connect connection to Oracle databases, Apple Computer, Inc.'s Data Access Language server and a Gupta Technologies, Inc. link between Microsoft Corp.'s Windows 3.0 applications and the Teradata server.

The new "client" hardware platforms include the Hewlett-Packard Co. HP 9000 Series 800 workstations, the Pyramid Technology Corp. MIServer, the AT&T System 7000 and AT&T's 6386 Work Group Systems for personal computer local-area networks running Unix.


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NEW PRODUCTS — SOFTWARE

## Unix software

Computer Consulting Service Enterprises, Inc. (CCS) has announced Call Tracker, a contact management package for The Santa Cruz Operation's SCO Unix and SCO Xenix operating systems.

Call Tracker users can access multiple databases with several search functions and six definable tables for contact classification. The product costs $1,995 for an unlimited number of users.

**CCS**
**5161 Ocean Gateway**
**Trapp, Md. 21673**
**(301) 820-4670**

Applix, Inc. recently announced that it has begun shipping Release 2.0 of Aster*x.

Aster*x (previously named Asterix) is an office integration software package for Unix systems. The new version includes an improved graphical user interface, international dictionaries, new graphics editing tools and additional on-line Help. The scripting facility has also been enhanced.

Pricing for the Aster*x package starts at $695.

**Applix**
**112 Turnpike Road**
**Westboro, Mass. 01581**
**(508) 870-0300**

## Languages

Harris Corp.'s Computer Systems Division has announced C++ for the Harris Night Hawk 4000 line of real-time computer systems.

The compiler is integrated into the firm's common compiler suite, which includes support for C, Fortran and Ada. The C++ compiler supports AT&T's C++ libraries and includes a tool kit for creating graphical user interfaces.

It is priced at $3,000.

**Harris Computer Systems Division**
**2101 W. Cypress Creek Road**
**Fort Lauderdale, Fla. 33309**
**(305) 974-1700**

## Applications packages

A new release of the PS/HRMS client/server human resources software has been announced by Peoplesoft, Inc.

PS/HRMS Release 2.0 adds international support and new payroll functionality and reporting to the integrated software system. A tree editing feature for hierarchical relationships and a security feature are also included.

Pricing ranges from $150,000 to $700,000, depending on hardware configuration.

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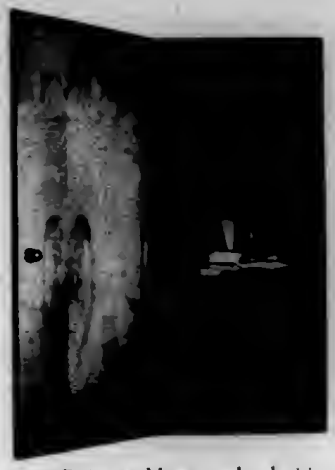

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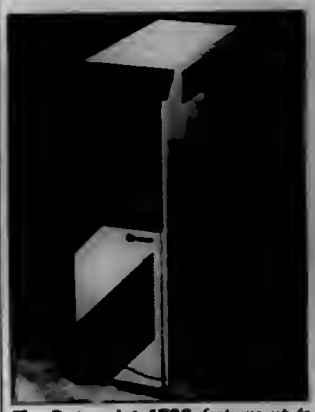
HARDWARE

## Processors



**The Datapoint 4733** *features up to three Intel 1486 processors*

Datapoint Corp. has announced symmetric multiprocessing Unix systems.

The Datapoint 4733 features up to three 33-MHz Intel Corp. 1486 processors with 128K bytes of cache memory and a minimum of 16M bytes of system memory. The Datapoint 4925 has capacity for up to eight of the processors and includes a math coprocessor for each CPU and at least 32M bytes of memory.

Both systems (ranging from $20,000 to $75,000) include standard Ethernet and Transmission Control Protocol/Internet Protocol connectivity.

**Datapoint**
**8400 Datapoint Drive**
**San Antonio, Texas 78229**
**(512) 699-7000**

## Data storage

Cambex Corp. has added a 1G-byte capacity ¼-in. cartridge tape drive to its line of storage systems for IBM RISC System/6000 workstations.

The Certainty 6800-70 ($3,200) stores 1G byte of uncompressed data in less than 45 minutes, the company said. The subsystem includes a streaming tape drive, cabling and a 1G-byte cartridge.

Cambex has lowered the cost of its 525M-byte ¼-in. cartridge drive for the RS/6000 from $3,455 to $2,610.

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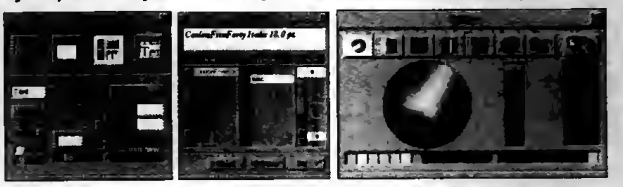

*The NeXTstep development environment delivers all the benefits of a true object-oriented system. Sophisticated application objects are all provided, along with the power to sub-class and create exactly the objects you need.*

NeXTstep's Application Kit™ provides the interface and system objects common to most programs, ready to use without any modification. That includes windows, scrolling regions and buttons, as well as objects for printing, faxing, opening/saving files, storing data, choosing fonts/colors, sound processing, even interapplication communication – complete with standard dialogs.

The Interface Builder™ makes it much easier to design programs that work exactly as you envision them. You use the mouse not only to place and resize your interface objects, but to change their attributes and show how objects interact – all without writing even a trace of code. Interface Builder also helps you manage every aspect of your application and all of your code (both C++ and Objective-C are supported).

However, this is only a small part of the power you wield, because NeXTstep's object library is completely open. That is, you're free to customize the behavior of any object via sub-classing, and you can also create new objects that instantly become as easy to work with as the ones we supply.

Once an object exists, it can be used again in new applications, so you won't have to reinvent the wheel with each new project. And when you want to change specific functionality in a program, you know exactly where to look. Updating is just a simple matter of modifying one of your objects.

Of course, in the world of NeXT workstations, custom applications continue to offer unique benefits even after they've been deployed. They're easy to use and consistent, so training time is minimized. They offer stunning graphics and full access to all system services. In addition, they integrate seamlessly with each other, multimedia electronic mail and the "best-of-breed" off-the-shelf solutions.

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PC & WORKSTATION SHORTS

## Compaq gives cover

**TRW, Inc.**'s Customer Service Division has announced a warranty enhancement program that can provide on-site maintenance of **Compaq Computer Corp.** computers for as low as $39 per year. TRW Compaq Care Plus will provide next-day service for customers with more than 100 Compaq Deskpro computers for a monthly charge of $3.25 per computer.

**Compaq** has announced a Corporate License Program for its version of Microsoft Corp.'s MS-DOS Version 5.0. License packs, with no documentation or disks, are available for $50 per license for 100 to 999 licenses, $40 each for 1,000 to 4,999 licenses and $36 each for 5,000 or more licenses.

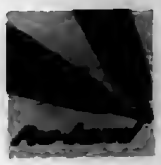
**Phoenix Technologies Ltd.** and **Scriptel Corp.** have stated their intentions to cooperate in developing products for the pen-based computer industry. Scriptel produces an input system on which pen-based computers can be constructed. Phoenix supplies basic I/O system software to a number of computer companies.

# Pen computers face technical obstacles

ANALYSIS

BY JAMES DALY
CW STAFF

The promising pen-based computer industry is in danger of stumbling before it gets off the ground, thanks to a pair of vital and related hardware technologies that give far less than the minimum performance level needed for a broad-based pen machine.



Researchers said both the display and battery technologies used in the current crop of pen-based models are grossly inadequate even for current needs.

"Everybody is getting carried away with the flash of pen-based software, but the technology to make a broad, horizontally appealing pen computer just isn't here yet and [is] not likely to arrive for several years," said David Mentley, director of display research at the Berkeley, Calif., office of Stanford Resources, Inc. a technology research firm.

The trouble begins with the screens, which use supertwist nematic (STN)-type LCDs. These screens consist of a layer of malleable material — the liquid crystals — sandwiched between two polarizing filters. Between the sheets and the liquid crystal layer runs a thin grid of transparent electrodes. In supertwist screens, the liquid crystal molecules have a more pronounced twist to improve contrast.

These displays, however, have already proven deficient to blue-collar workers using them in environments ranging from subzero cold to desert heat. As temperatures dip, the response time of the displays slows considerably, Mentley said. At zero degrees centigrade, many STN displays have a response time of several seconds.

Even more commonplace will be the pen computer that overheats on the car seat. The extreme heat can make the liquid crystal go isotropic — it gets black until it cools down.

Screen manufacturers are working on alternatives that are

*Continued on page 40*

## Bright promise

If all the technological challenges are met, sales of pen-based systems should flourish in the next few years, according to analysts who see pen systems luring millions of mobile professionals who do not use a computer but could benefit from one: stock clerks, insurance adjusters, field sales professionals and construction workers, for example.

Improvements in handwriting recognition, display technology, durability and pricing will drive pen-based computers from vertical markets into broader horizontal business. Market researcher Computer Intelligence/Infocorp estimates that annual sales of pen-based computers will hit 3.4 million units by 1995 — up from less than 100,000 units today.

The electronic stylus is expected to serve as the foundation of systems ranging from travel reference companions that pop up on-screen electronic maps to portable offices equipped with fax machines. But today, sales of pen systems are slow. Grid Systems Corp., one of just a few firms now shipping pen systems, sold only 10,000 machines in 1990, according to Grid President Alan Leftof. That figure is expected to rise to 30,000 this year, he said.

# Users snub IBM/Microsoft squabble

BY ROSEMARY HAMILTON
CW STAFF

Some users contacted recently said they are tuning out the ongoing IBM OS/2 vs. Microsoft Corp. Windows battle, which most recently has focused on future support for current holders of the Microsoft OS/2 Release 2.0 developers kit.

"It means nothing," said Ron Roy, the manager of the division of information resources management at the Illinois Department of Commerce and Consumer Affairs. "They can bicker all they want," he added.

Roy and other users said that while future directions for desktop software vendors certainly matter, they try not to get caught up in day-to-day repositioning.

John Meadows, a senior vice president of system architecture and development at the Bank of Montreal, said the debate is an issue, but "I worry about many other things as well."

Meadows said the bank has not made a final commitment to a desktop operating environment but should "within the next six months." When it does, the bank will zero in on economic and integration factors, he said.

For Jim Wagoner, a business analyst at Continental Bank Corp., the goal is to "stay on course" with the bank's earlier commitment to OS/2.

"We try to isolate ourselves from that type of manipulation," Wagoner said. "We made a decision on this. We will continue with it, regardless of the potential of buyouts, trends and mergers. We certainly do care . . . but there's no jumping or changing midstream."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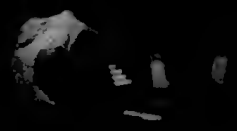

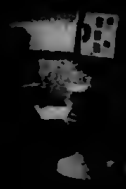

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# Firms face off in Windows ring

*Word vs. Wordperfect challenge comes down to differences in features*

BY CHRISTOPHER LINDQUIST
CW STAFF

Wordperfect Corp. and Microsoft Corp. finally entered the same ring recently with the release of long-awaited Windows-based word processing products and upgrades. The bout will determine who will become the dominant personal computer word processing vendor. Microsoft, the reigning Windows word processing market leader, unveiled Version 2.0 of Word for Windows, while Wordperfect, long the DOS-based champion, shipped Wordperfect for Windows 5.1.

Both products have a lot to offer anyone looking for a Windows word processor, though Word adds a few extras not found in Wordperfect. A full installation of Wordperfect takes about 9M bytes of space. Word requires more than 14M bytes. Both products allow the user to save space by not installing certain features.

Installation of both products was straightforward. Wordperfect uses a DOS-based installation program similar to the one in DOS Version 5.1. Installation can be automatic using supplied defaults, or the user can modify such things as destination directories and whether such features as the macro converter will be installed. Word uses a Windows-based install program that functions in much the same way.

Wordperfect can be installed with either a Common User Access (CUA)-compliant keyboard layout or a Wordperfect 5.1 layout; users are able to reinstall the other layout at a later date or reconfigure the keyboard to meet their own requirements. Word uses a CUA layout but allows users familiar with Wordperfect to use Wordperfect Help. Users can then use Wordperfect commands while being shown the related Word commands.

Ease-of-use features abound. Both products allow access to commonly used commands and macros by pressing icons, called a Toolbar in Word or the Button Bar in Wordperfect. Word's buttons are smaller, allowing more of them to appear on the screen at one time. However, users not familiar with a mouse may find themselves missing an icon once in a while. Wordperfect's larger buttons include both a graphic and text.

Wordperfect includes a spell checker and thesaurus. Word has the same and adds a grammar checker. Other extra features in Word include the ability to print curved, colored, rotated and flipped text using the Wordart tool. Word's graphics-editing functions are also more advanced than Wordperfect's functions, which allow only such attributes as size and rotation to be modified.

Word also includes 51 automated tutorials on such tasks as creating documents, setting tabs and making footnotes. Users are first shown what to do, then asked to perform the operation on a sample document.

The feature may be a welcome addition to information systems support people tired of answering user questions on basic functions.

Wordperfect supplies standard-format Windows Help and also offers a "What is" function that allows a user to click on an item and view the appropriate Help file.

**Reference guides galore**

Documentation for both products is clear, well-indexed and substantial. Word comes with a user's guide and thin "Getting Started," "Equation Editor," "Draw" and "Graph" volumes. Wordperfect includes a reference guide and a workbook with several lessons intended to familiarize users with the product.

In all, both products are well-designed and easy to use, and no bugs were encountered. Wordperfect does not include some of the more desktop publishing-like features of Word, such as the graphics editing and Wordart modules, but for many users they will be unnecessary.

Word has a more polished feel, as it should, since it is an updated product and adds some features, such as the on-line lessons and Wordperfect Help, that should make training new users easier than with some other products.

In all, the differences between the two products are subtle, and it may be that such things as product support reputation and previous experience will play a major role in decisions as to which product to purchase.

**Key features for Wordperfect and Word:**

Wordperfect 5.1 for Windows costs $495, but a competitive upgrade from Word for Windows is available for $150.

- Button Bar for easy command access.
- File Manager with Quick List for often-used files.
- Keyboard compatibility. Compatability with most Wordperfect 5.1 for DOS macros.

Word for Windows 2.0 costs $495, and competitive upgrades from Wordperfect for DOS, IBM Displaywrite and Ashton-Tate Multimate cost $129.

- Toolbar for accessing commonly used commands.
- Wordart, Graph, Draw and Equation Editor modules.
- On-line lessons.
- Wordperfect Help eases transition to Word.

CW Chart: Janell Genovese

# Dolch tailors portables for multimedia

BY MICHAEL FITZGERALD
CW STAFF

MILPITAS, Calif. — Multimedia is barely gracing desktop computers, but Dolch Computer Systems, a division of Dolch American Instruments, Inc., recently released what it calls a platform to support portable multimedia.

The Dolch P.A.C. line of luggables — AC-powered 18-pound models based on Intel Corp.'a 80386 and I486 microprocessors — now have options that will make them fully compliant with the Multimedia PC consortium standards.

Dolch's P.A.C. line already featured full-motion video capabilities and a color display. The machines use a Sharp Electronics Corp. thin-film transistor (TFT) display and Chips and Technologies, Inc.'a Video Graphics Array flat-panel display controller. Dolch will bundle a full-motion video board, a compact disc/read-only memory (CD-ROM) drive, a digital audio subsystem and Microsoft Corp.'a Multimedia extensions for Windows in a package it calls M.P.A.C. ($3,995).

**Screen options**

Dolch will also offer an option called Screenpac ($6,995), an active matrix TFT overhead projection screen designed for multimedia presentations.

"Maybe Dolch is putting on some extensions to go after the audio/video market," said Dan Ness Jr., a microcomputer analyst at Computer Intelligence/Infocorp, a market research firm in La Jolla, Calif. "They figure they have the power and the weight, so why not a multimedia platform? I have mixed feelings about multimedia — it'a a solution looking for a market."

Dolch is also shipping its M.A.C.H. series — 13-pound, liquid-cooled, scalable portables that offer room for one to seven add-in cards. Dolch calls its scalable architecture Multislice and supports CD-ROM, Iomega Corp.'s Bernoulli drives and removable hard drives. The M.A.C.H. series is based on chips from both Intel and Advanced Micro Devices, Inc.

New New New New New New New New New New New New New New New New New New New New New

# Announcing the $49 Upgrade for SPF/PC®

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- display compiler messages inline with source
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- change file attributes

A special upgrade price of $49 plus shipping and handling is available until Dec. 31, 1991. We're so confident you'll love SPF/2 that we'll refund your purchase price if you're not completely satisfied.

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See for yourself today. Just call 800-648-6700 and ask for demo disk #215. Quantity discount pricing and Multi-User licensing is available.

CTC® Command Technology Corporation
1040 Marina Village Pkwy., Alameda, CA 94501
*Phone:* 510-521-5900 *Fax:* 510-521-0369
*Orders:* 800-336-3320

# Weathering the effects of volcanic action

*National Weather Service implements workstation-based forecasting tools in Alaska*

ON SITE

BY J. A. SAVAGE
CW STAFF

ANCHORAGE, Alaska — It is not enough that Alaska has a colder and sometimes darker environment than the lower 48 states. What trips up meteorologists is the state's string of volcanoes — 35 of them stretching from the Gulf of Alaska through the Aleutian Islands.

It was volcanoes, not subfreezing temperatures, that prompted Congress last year to allow the National Weather Service to implement workstation-based forecasting separate from the nation's 1970s-vintage forecasting system.

In December 1989, Mt. Redoubt — due east of Anchorage — exploded. "It created tremendous havoc in regard to ash fall," said Gary Hufford, regional chief scientist at the weather service. The ash affected not only the weather, but it also crept into the computers in Anchorage, and they had to be shut down. Inability to predict the effect of the ash because of the shutdown and insufficient data-gathering equipment for air travel caused all four engines of a 747 to temporarily shut down in midair with 300 people on board, according to Hufford.

Forecasting for air travel is one of the weather service's most important jobs. "Alaska is such a huge, god-awful state for people to traverse; most people fly as a main means of transportation," Hufford said. One of the state's primary industries, fishing, also relies heavily on weather forecasts.

### Grant for redesign

In the wake of the volcano eruption, Sen. Ted Stevens (R-Alaska) sponsored a bill to give the Alaska offices of the National Weather Service $7.2 million to redesign and implement better forecasting hardware and software. "All the software was done by five programmers in 13 or 14 months," said Carven Scott, regional computer systems manager of forecast operations. The hardware included a Doppler radar wind profiler to determine where volcanic ash will go, new radar, a satellite downlink and the computer system to crunch the numbers from the new equipment.

Hufford ended up with four Hewlett-Packard Co. HP 9000 Model 720 workstations and an IBM RISC System/6000 as a server for network management, the database and applications. The HP machines produce images for forecasters from radar and satellite downlinks. The workstations eliminate the need to rely on data from the National Weather Service, which processes information on a Data General Corp. Eclipse minicomputer, installed in 1978.

Janell Genovese

Hufford decided on reduced instruction set computing (RISC) architecture because of "the tremendous speed of the computers and because we're spending the public's money."

Of the $7.2 million, only $520,000 was allocated to buy workstations. RISC was specified in the request for proposals, according to Jim Kemper, chief of the environmental and scientific section of the service in Anchorage. "There was no reason to go to a mainframe. For instance, that much taxpayer money could buy a [midrange] Digital Equipment Corp. VAX 6000 Model 640." The aggregate power of the weather service's workstations is more than 250 million instructions per second.

### Clouds on display

The HP workstations present meteorologists with displays that can be manipulated to bring out certain features, such as cloud density and temperature stratification, as needed. Two Prime Computer, Inc. minicomputers, installed in 1982, process alphanumeric information from other weather centers.

They also act as a rudimentary database for mapping information from the National Weather Service. Scott said the Prime minicomputers can "slice through some information, like if you wanted to change between metric and English measurements." The RS/6000 can download that information.

While Alaska meteorologists appear enthused about using workstations and the resulting graphics instead of images sent from Washington, D.C., on ancient fax machines, it is difficult to determine whether the new equipment actually results in better forecasting. For instance, during a *Computerworld* interview this fall, the morning weather report for Anchorage called for rain and temperatures in the mid-50s, but it turned out to be balmy and in the mid-60s.

# LAN-based software keeps meetings on track

BY CHRISTOPHER LINDQUIST
CW STAFF

In an ideal meeting, a variety of opinions and ideas can be aired and discussed, with the intended result being decisions that will help make a work group, department or company more productive, efficient and profitable.

Most meetings are far from ideal, however. Time is wasted on topics not related to the matter at hand. Less forceful members may participate very little. Stronger or more senior members may dominate discussions and stifle any suggestions deviating from their own. As a result, many people feel meetings are rarely as fruitful as they could be.

Tucson, Ariz.-based Ventana Corp., owned by the University of Arizona, has responded to this situation with technology — software that can run over a local-area network and provide a variety of tools intended to keep meetings focused and productive. The software, Groupsystems, was developed at the university and has been used by a variety of groups looking to improve their meetings.

"Here is a beautiful marriage between technology and human resources management," said Brett Boston, president of Group Solutions in Atlanta. Boston has been using a variety of groupware products, including Groupsystems, for about 1½ years. He said one of the primary benefits of Groupsystems is the anonymity it provides. Suggestions are typed in by users sitting at terminals, with no names attached to the comments. "Ideas become separate from the personalities or the power of the person saying them," Boston said. "They stand or fall on their own merits."

> ONE OF THE primary benefits of Groupsystems is its anonymity.

Tom McMillan, manager for contract accounting at Greyhound Financial in Phoenix, agreed that the system's anonymity is important, but he said what is even more beneficial is the fact that all participants can "talk" simultaneously, in effect multiplying the amount of discussion in any length of time.

Some users may have initial concerns about the system if they lack typing skills or fear that meetings may not be truly anonymous, but they get over these fears quickly. "After 10 minutes, people feel very comfortable," McMillan said.

A "facilitator" helps keep the discussion on track and can perform such functions as calling for votes, making outlines of ideas and ranking topics for discussion. The software can either be used on a LAN setup in a specific meeting room or run from users' offices over an existing LAN. A transcript of the meeting can be saved to disk and printed, eliminating the need for minutes to be taken.

One other benefit of the system is that people who feel as if they are constantly in meetings may be able to get more accomplished in less time, freeing them to do their jobs. "Immediately, you're going to get a 50% time saving," Boston said.

Groupsystems runs on Ethernet or Token Ring LANs running either Novell, Inc.'s Netware or IBM's Personal Computer LAN. It is available in Basic Toolbox ($42,500) and Advance Toolbox ($57,500) versions; the advanced version provides tools to aid with complex problems. Both products come with a year of support, training for six facilitators, full documentation and newsletters.

# Pen-based computers face a few technical obstacles

CONTINUED FROM PAGE 35

subject to the whims of temperatures, but these also have problems. The gas plasma screen, for instance, produces a bright orange-red display that can be hard to get used to. Additionally, yellowish electroluminescent panels, which rely on the ability of certain materials to glow heatlessly when a current is applied, tend to burn out quickly.

"There's no doubt that there is a problem with screen displays," said Ken Dulaney, director of marketing for portables at Grid Systems Corp., which produces one of the few pen-based machines on the market. "We've got a lot of research going on and expect to have it ironed out in a year to year and a half."

Most of these LCDs also rely on backlighting, which is much preferred over the reflective mode but is draining on many subsystems. An efficient backlight for a monochrome display uses approximately 4W of power, Mentley said, and a nickel cadmium battery stores an average of 40W an hour/kilogram.

Thus, a 1-kilogram (2.2-pound) battery is needed to support the machine for 10 hours, or slightly longer than a workday. Pen computers are targeting only three to four pounds of total weight.

This power problem is multiplied when a color display is considered. Since the color filter used in most color displays filters out selected bands from white light, the technique is inefficient: Only 2% to 3% of the light is used. This translates to a power use of between 15W and 25W — not very compatible with the portable computer concept.

Some vendors have tried to circumvent these energy problems with clever hardware solutions, such as features that shut down the disk drive or processor when the keyboard is not used for, say, five minutes.

The ultimate resolution, however, will be the development of more efficient batteries. Research is being done with lithium batteries, but they have some serious safety problems: Under certain pressures and moisture conditions, they tend to explode.

So, while the pen-based computer market certainly bears much promise, it cannot go blindly ahead without significant advances in key areas. "These aren't insurmountable obstacles, but they do need to be addressed," Mentley said.

# AST Premium II: Quality at a high price

*Technology Analysis — A roundup of expert opinions about new products. Summaries written by freelance writer Suzanne Weixel.*

AST Research, Inc.'s Premium II modular personal computer, ranging from a 20-MHz, 386SX to a 33-MHz 486, is well designed but expensive.

**Performance:** BIOS, I/O ports and video circuitry are on the motherboard and run at the Industry Standard Architecture bus' 8-MHz speed. Processing, random-access memory and caching are handled by AST's proprietary Cupid-32 architecture.

**Design:** With so much on the motherboard, there is plenty of room inside the small footprint. When fully loaded, there is one 8-bit and two 16-bit slots open. Storage options include a 40M-byte internal tape drive.

**Ease of upgrade:** The system is upgradable using AST's Fastboard CPU. Even novices should be able to upgrade in a matter of minutes.

**Service and support:** AST offers a one-year warranty, a toll-free technical support line and fax and bulletin board service support.

**Value:** The Premium II system can grow with you, but quality does not come cheap. Base prices range from $1,595 to $4,495. Prices for the Fastboard upgrades range from $1,545 to $2,595.

## AST Premium II 386/33

| Reviews | Performance | Design | Ease of upgrade | Service and support | Value | Overall |
|---|---|---|---|---|---|---|
| [illegible] | | | | | | |
| *PC Week* 9/2/91 | Good | Good | Good | NC | Upgrade price needs improvement | New approach, easy upgrade |
| [illegible] | | | | | | |
| *PC Computing*** 7/91 | Good | Solid system | Upgradable | NC | Acceptable price | New class of system |
| **Users** | | | | | | |
| [illegible] | | | | | | |
| Dale Modern, State of Washington | ■ | ■ | ■ | ■ | ■ | Costs more, but saves in long run |
| [illegible] | | | | | | |
| **Analysts** | | | | | | |
| Andrew Seybold, Dataquest, Inc. | ▙ | ■ | ■ | ■ | ▙ | High quality, good price performer |
| [illegible] | | | | | | |

Key: ▙▙ Very good ▙ Good ▌ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment. **Infoworld* ratings based on 1 to 10 scale. ***PC Computing* reviewed 486/SX120.

## Vendor financial ratings

| Analysts | Short-term performance | Long-term stability |
|---|---|---|
| [illegible] | | |
| Benny Lorenzo, Dillon, Read & Co. | ▙ | ▙ |

AST reported first-quarter 1992 net income of $16.5 million on sales of $197.1 million. Despite these strong results, McGlone said he believes that the company will be pressured by competition in the future.

### AST Research responds

*Larry Fortmuller, director of high-performance systems:*

**Performance:** Putting the video on the motherboard is the most economical. Users can upgrade by disabling it and plugging in another card.

**Value:** The upgrade prices may seem high now, but three years down the road, when you need the upgrade, these prices will be highly competitive.

# Northgate SP: Solid support, low cost

## Northgate's Slimline/Elegance 386

| Reviews | Performance | Design | Ease of upgrade | Service and support | Value | Overall |
|---|---|---|---|---|---|---|
| *Infoworld* 11/11/91 | Very good | Good | Very good | [illegible] | [illegible] | 7.5* |
| *PC Week* 9/2/91 | Good | Good | Good | NC | Good upgrade price | Range of options for competitive price |
| *PC Computing* 7/91 | Fast | NC | [illegible] | NC | [illegible] | [illegible] |
| **Users** | | | | | | |
| Ronald Wish, TRW-AAD, Inc. | ■ | ▙ | NC | ■ | ■ | Reliable and cost-effective |
| David Wind, [illegible] Publications, Inc. | ▙ | ▙ | NC | ■ | ■ | Looks simple to upgrade |
| John Bell, CES | ■ | ▙ | ▙ | ▌ | ■ | Best bang for the buck |
| [illegible] Public Service Electric & Gas Co. | ■ | ■ | ■ | ■ | ■ | [illegible] |
| **Analysts** | | | | | | |
| Andrew Seybold, Dataquest, Inc. | ■ | ▙ | ▙ | ▙ | ■ | Good machine |
| Jerry Cheng, [illegible] Information Services | ▙ | ▙ | ▌ | ▙ | ▙ | [illegible] |

Key: ▙▙ Very good ▙ Good ▌ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment. **Infoworld* ratings based on 1 to 10 scale.

## Vendor financial information

[illegible]

### Northgate responds

*Art Lasere, Northgate chairman:*

**Design:** Even in the Slimline model, you can reach four expansion slots, and with so much built into the motherboard, that should be more than enough. If it is too tight, you can give up the small footprint for the Elegance model, which offers lots of room.

**Financials:** We showed a small loss this past quarter, but that's not unusual in this business.

Pricing and support set Northgate Computer Systems, Inc.'s SP modular personal computers apart from the competition.

**Performance:** Reasonably fast, the SP models support 32M bytes of 32-bit random-access memory. Cache memory of 64K bytes, upgradable to 256K bytes, enhances throughput.

**Design:** The Slimline small footprint model is tight on space, with one drive bay and five slots open after configuration. The Elegance desktop and tower versions are cavernous, offering six full-length and one half-length 16-bit Industry Standard Architecture slots and support for three half-height drives and one full-height or two half-height internal hard drives.

**Ease of upgrade:** The 486 upgrade module is a complete replacement for the 386 board. The replacement process takes five minutes.

**Service and support:** Northgate offers a one-year warranty, a 30-day money-back guarantee, a 24-hour toll-free support line and bulletin board service.

**Value:** Low prices, first-rate support and solid performance make the Northgate systems a good choice. A Slimline 386/33 system costs $3,299. The Elegance 386/33 costs $3,399. The 486/33 upgrade module costs $799, including a $200 trade-in discount.

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NEW PRODUCTS

## Software applications packages

Pageahead Software Corp. has introduced Pageahead Version 1.1, an upgrade of its database publishing software package.

Pageahead 1.1 runs on personal computers under Microsoft Corp.'a Windows. It automatically generates catalogs, financial statements and other document types by providing an interface between database data and common desktop word processing packages.

Pageahead 1.1 works with Oracle Corp., Borland International, Inc. and ASCII databases and word processors from Wordperfect Corp. and Microsoft.

The product costs $795.

**Pageahead Software**
**Suite 301**
**2125 Western Ave.**
**Seattle, Wash. 98121**
**(206) 441-0340**

Pacestar Software has announced Edge 4.1.

Edge is a software tool for flowcharts and organizational charts. The new release includes enhanced printer support and additional chart line styles. Edge 4.1 charts can also be exported to word processing file formats.

The price has been reduced from $329 to $229.

**Pacestar Software**
**4815 E. La Puente Ave.**
**Phoenix, Ariz. 85044**
**(602) 893-3046**

Desmond International, Inc. has announced the availability of Perfect Presentations 2.0, a presentation graphics software add-in for Wordperfect Corp.'s word processing package.

Perfect Presentations ($95) allows users to develop charts and graphs from within Wordperfect 5.1. It includes a set of templates, high-resolution fonts and tools for handling clip art.

**Desmond International**
**Suite 3001**
**99 High St.**
**Boston, Mass. 02110**
**(617) 338-9650**

## Software utilities

Systems Compatibility Corp. has announced a version of its Writer's Toolkit for the Microsoft Corp. Windows environment.

The Writer's Toolkit incorporates seven tools, including a grammar and spell checker, a dictionary and a thesaurus. A dictionary of common knowledge with geographical, historical and political information is also included.

The package costs $129.

**Systems Compatibility**
**Suite 600**
**401 N. Wabash**
**Chicago, Ill. 60611**
**(312) 329-0700**

Powersoft, Inc. has announced Tame, a software utility that speeds up application performance in a multitasking environment.

Tame works with DOS-based programs under most multitasking software environments. It is a terminate-and-stay resident program requiring 1.6K bytes of memory.

Tame costs $79.

**Powersoft**
**208 Baynes Point**
**Suwanee, Ga. 30174**
**(404) 418-0821**

## Macintosh products

Ashlar, Inc. has announced Ashlar Vellum 3D for the Apple Computer, Inc. Macintosh.

The computer-aided design product includes an advanced version of the Drafting Assistant, which automatically generates precise three-dimensional wire-frame drawings, the company reported. It also features unlimited views and an on-screen trackball for simple drawing rotation.

List price for the package is $2,495. Until Jan. 31, a price of $2,245 is offered. Upgrades from Ashlar Vellum 2D cost $250 until Jan. 31 and $500 thereafter.

**Ashlar**
**Suite 218**
**1290 Oakmead Pkwy.**
**Sunnyvale, Calif. 94086**
**(408) 746-3900**

Impulse Technology Sales has announced Ciphervault/NB, a Data Encryption Standard-compliant Nubus card for the Apple Computer, Inc. Macintosh.

The card accelerates encryption for all data on the system by an average of 200 times, according to the company. The company also announced Keymaster, a software package for managing the encryption and data access procedures.

The Ciphervault/NB card is priced at $2,495.

**Impulse Technology Sales**
**210 Dahlonega St. #205**
**Cumming, Ga. 30130**
**(404) 889-8294**

Fusion Data Systems has begun shipping a Motorola, Inc. 68040-based accelerator for the Apple Computer, Inc. Macintosh IICI.

With Tokamac CI, the IICI offers higher levels of performance than Apple's new Quadra systems, according to Fusion Data Systems. The product installs in the cache card slot of the IICI, leaving all Nubus slots open.

The product is priced at $3,195.

**Fusion Data Systems**
**Suite 350**
**8920 Business Park Drive**
**Austin, Texas 78759**
**(512) 338-5326**

## Systems

CAF Technology, Inc. has introduced two small-footprint desktop workstations.

The CAF Slimmore 386SX/20 features up to 4M bytes of memory, on-board support for 1,024- by 768-pixel Video Graphics Array (VGA) display and two drive bays in a case measuring 10.6- by 12.7- by 3.2-in. With 1M byte of memory, the Slimmore is priced at $690.

The CAF Slimcase offers up to 8M bytes of memory and three drive bays with a larger power supply and larger footprint. It does not include on-board VGA support. The Slimcase with 1M byte of memory costs $705.

**CAF Technology**
**600 S. Date Ave.**
**Alhambra, Calif. 91803**
**(818) 289-8299**

**Bell Computer Systems'** *desktop machine costs $1,995*

Bell Computer Systems has announced a $1,995 desktop machine based on the Advanced Micro Devices, Inc. 25-MHz 386SX processor.

The base configuration includes 2M bytes of random-access memory, six expansion slots, a Super VGA monitor and a 105M-byte hard drive. DOS and Microsoft Corp.'s Windows 3.0 are also bundled with the system.

**Bell Computer Systems**
**6615 Valjean Ave.**
**Van Nuys, Calif. 91406**
**(818) 909-3501**

Micronics Computers, Inc. has unveiled two new scalable multiprocessing systems.

The SMP-2000 offers up to two Intel Corp. I486 processors with 256K bytes of write-back cache for each processor, a minimum of 8M bytes of random-access memory and six expansion slots. The SMP-4000 includes up to four processors and also offers higher RAM capacity and more expansion slots.

Pricing for an entry-level system is less than $10,000.

**Micronics Computers**
**232 E. Warren Ave.**
**Fremont, Calif. 94539**
**(510) 651-2300**

## Development tools

Inference Corp. has announced CBR Express 1.1 for Microsoft Corp.'s Windows environment.

CBR Express is a client/server application shell for the company's Art-Im/Windows 2.5 knowledge-based systems development tool. It creates and accesses knowledge bases of business cases without requiring programming. The new release features enhanced performance and additional tools for managing knowledge bases. It also offers a help desk template and an improved user interface.

The CBR Express Customization Kit carries a base price of $10,000. The price per user for application use starts at $4,000 and decreases as the number of users rises.

**Inference**
**550 N. Continental Blvd.**
**El Segundo, Calif. 90245**
**(213) 322-0200**

Kilowatt Software has announced Rexx/Windows, a graphical Rexx programming environment.

The product runs under Microsoft Corp.'s Windows environment. It includes the Portable/Rexx interpreter as well as an on-line Help system and source code for numerous example programs. Dynamic Data Exchange and Object Linking and Embedding are supported, and users can define and control graphical user interface objects.

Introductory pricing is $109. The DOS version of Portable/Rexx is included as part of the package.

**Kilowatt Software**
**1945 Washington St. #410**
**San Francisco, Calif. 94109**
**(415) 346-7353**

## Peripherals

Computer Peripherals, Inc. has announced the Jetype IIP scalable font cartridge for Hewlett-Packard Co. Laserjet IIP printers.

Jetype IIP includes 13 Truetype typefaces and additional fonts for spreadsheets. According to the company, the cartridge provides the font scaling capabilities of the HP Laserjet IIIS for the IIP model.

The price is $249.

**Computer Peripherals**
**667 Rancho Conejo Blvd.**
**Newbury Park, Calif. 91320**
**(805) 499-5751**

## Board-level devices

Boca Research, Inc. has announced the Boca Start Card for personal computers.

The add-in card offers up to 1M byte of nonvolatile, rewriteable memory. It can be used as an instant boot-up card or as a nonsystem disk, the firm said.

A 128K-byte version costs $87.

**Boca Research**
**6413 Congress Ave.**
**Boca Raton, Fla. 33487**
**(407) 997-6227**

Almac Arrow Electronics
14360 S.E. Eastgate Way
Bellevue, WA 98007
800-426-1410

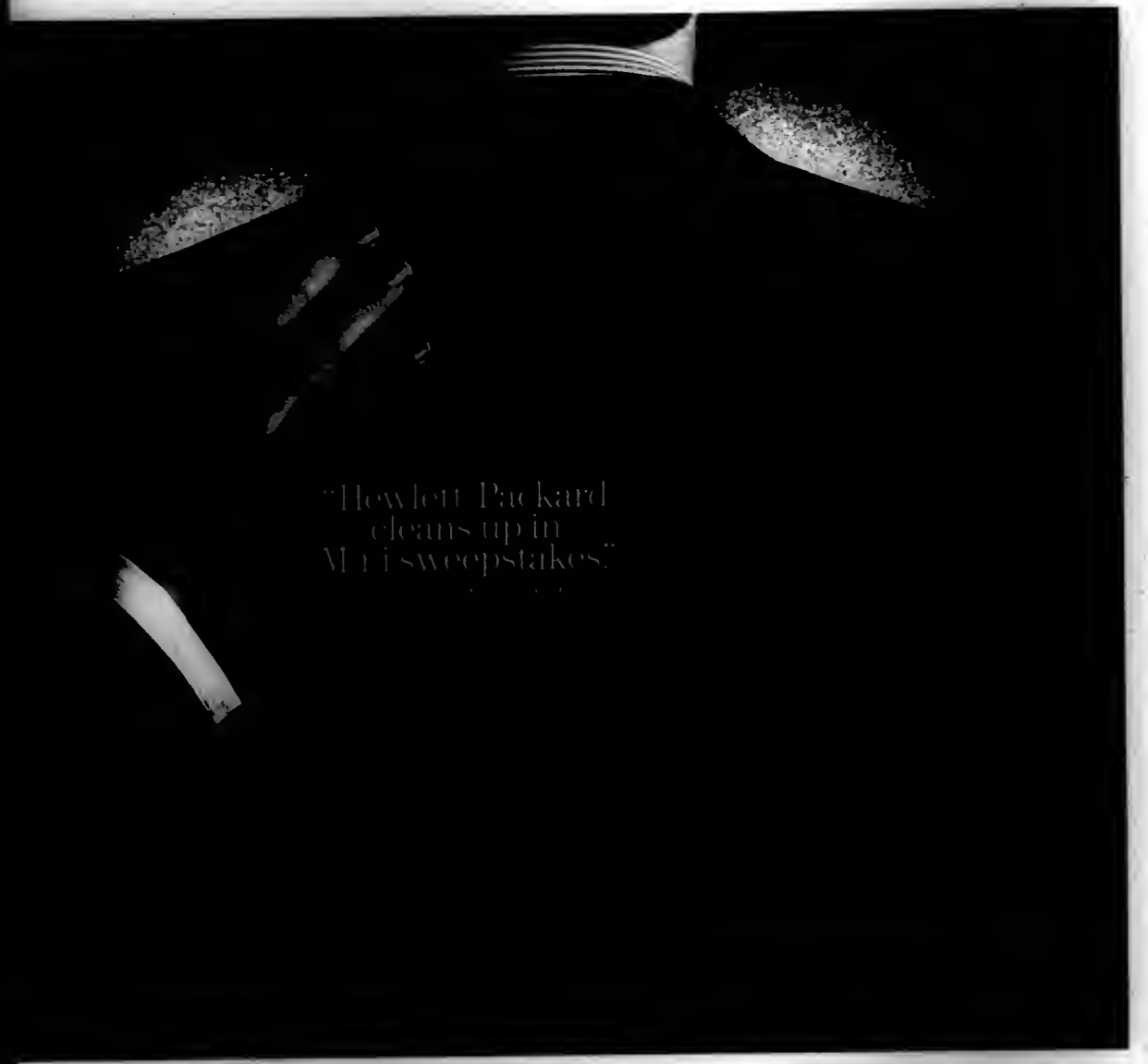
Avnet Computer
10950 W. Washington Blvd
Culver City, CA 90230
800-426-7999

MTI Systems Arrow Electronics
25 Hub Drive
Melville, NY 11747
800-645-6530

Pioneer Standard
4800 E 131st Street
Cleveland, OH 44105
800-874-6633

Pioneer Technologies
15810 Gaither Road
Gaithersburg, MD 20877
800-227-1693

Wyle Laboratories
128 Maryland Street
El Segundo, CA 90245
800-289-9953




# Another pat on the back for HP 3000 buyers.

In Computerworld's Buyers' Scorecard, the clear winner is Hewlett-Packard. According to the survey: "The (HP 3000) system captured the highest rating in 13 of 15 categories..."[1]

It went on to say: "While HP garnered its highest ratings in the categories of availability, future growth and compatibility, users also gave it very high marks in programming capability and interfacing with other vendors' systems...The system also topped the category of availability of third-party applications."

There's more. A study by the Sierra Group demonstrates that the HP 3000 has the lowest Cost of Ownership among the leading minicomputer companies.[2]

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HEWLETT PACKARD

[1]Computerworld, 9/24/90. [2]The Sierra Group, 1990.
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NETWORK SHORTS

## AT&T to boost SS7

**AT&T said it is considering a new service to bring the enhanced call-processing functions of common channeling Signaling System 7 (SS7) to customer premises. The SS7 functionality, which could include such services as identifying the source of a call as it comes in, would not only require network interface changes to AT&T central office equipment but would also hinge on the development of corresponding interfaces to terminating devices made for customers' premises by various vendors.**

**Wellfleet Communications, Inc. recently said it added network management and interoperability features to the frame-relay interface it has developed for its multiprotocol routers. The enhancements, which include allowing frame-relay networks to be managed by the Simple Network Management Protocol, are slated to be available by year's end. The other features allow routers from multiple vendors to interoperate across a frame-relay network and give frame-relay networks the ability to self-configure. The three enhancements were developed by Wellfleet and other firms and have reportedly been submitted to the Internet Engineering Task Force for standards approval.**

# ISDN not popular in Europe — yet

BY ELISABETH HORWITT
CW STAFF

Contrary to popular myth, Integrated Services Digital Network (ISDN) is not taking off like a rocket in Europe. Indeed, deployment of the telecommunications standard is running up against some of the same barriers it has hit in the U.S., according to a recent report by London-based research firm Ovum Ltd. and Fischer & Lorenz, a Danish research firm.

Today, ISDN availability differs widely from country to country. Thanks to the aggressive deployment of France Telecom, the French Postal Telephone and Telegraph authority, ISDN Basic Rate services are accessible to 100% of business users in France, according to the report. Basic Rate services define two 64K bit/sec. circuit-switched B channels.

On the other hand, as of July 1, commerical Basic Rate ISDN services were unavailable in Italy, the Netherlands, Scandinavian countries, Spain and Portugal. The services were available to less than 20% of Belgian users, and to between 60% and 79% of users in the UK and Germany, Ovum said.

### Same old story

Availability in Europe of Primary Rate services, which define 30 64K bit/sec. channels, was the same as for Basic Rate services in all countries except Belgium, which had 100% availability in July, and the UK, which had 80% availability.

"We're in the first phase of ISDN deployment in Europe, which involves limited coverage and services," said Len Elfenbein, president of Lynx Technologies, Inc., a Little Falls, N.J.-based research firm.

The next phase, which Europe is now entering, involves different service providers "attempting to resolve technical differences and then negotiating for interconnection" between their respective services, Elfenbein said. The "important phase," still some years off, brings "the introduction of second-generation networks that employ all negotiated settlements on technical approaches and standards," he added.

The European Commission has been actively urging European Community members to implement ISDN services. By January 1994, all member countries

*Continued on page 46*

**Continental divide**

*ISDN use in Europe ranges greatly, from nonexistence in some countries to thousands of lines in France and Germany*

| Country | Basic access | Primary access | Nature of services |
|---|---|---|---|
| Germany | 7,615 | 640 | Commercial |
| France | 5,000 | 500 | Commercial |
| UK | 500 | 1,700 | Commercial |
| Belgium | 800 | 25 | Commercial |
| Denmark | 700 | 0 | Pilot |
| The Netherlands | 100 | 0 | Pilot |
| Spain | 40 | 0 | Pilot |
| Other* | 0 | 0 | |
| Total EC | 14,755 | 2,865 | |
| U.S. | 100,000 | 500 | Commercial |
| Japan | 20,000 | 500 | Commercial |

* Greece, Ireland, Italy, Luxembourg, Portugal

Source: Ovum Ltd.

CW Chart: Michael Siggins

# GE Nuclear networks bloom after slow start

ON SITE

BY JIM NASH
CW STAFF

Technology consultants are fond of telling clients that only the lead mutt pulling a dogsled gets a change of view. It is their way of saying life is more interesting if you are the first to buy the newest gizmo.

Some network managers, including those at General Electric Nuclear Energy, think their lives are interesting enough. They have been content to wait for industry standards to form and for networking components to prove themselves.

GE Nuclear, a San Jose, Calif.-based unit of General Electric Co. that designs, builds and fuels nuclear-powered generators, is only now materially gearing up to network its primary U.S. sites. It might be considered behind the curve in adopting networking as an operations strategy, but GE Nuclear said it has avoided the pitfalls of using immature technology.

GE Nuclear's computations and information systems manager, Bob Carpenter, patiently waited out three or four "Year of the LAN" proclamations. Carpenter relented last year, beginning the first two phases of a multistep project to tie eight plants together. GE Nuclear laid a fiber-optic backbone in its San Jose headquarters and wired all eight sites with 10Base-T unshielded twisted-pair cables.

### The next step

Late last month, GE signed a contract worth at least $2.1 million with Hughes LAN Systems, Inc. in Mountain View, Calif., to bring up networks in each location and link them together in Phases 3 and 4.

As part of the contract, Hughes will install Banyan Systems, Inc. Vines Version 4.1 network software. Routers from Cisco Systems, Inc. and concentrators from Chipcom Corp. will also be installed.

Hughes is bringing terminal servers, network management software and access software for Transmission Control Protocol/Internet Protocol (TCP/IP) and Digital Equipment Corp.'s Decnet Local Area Transport protocol. Roughly 1,500 employees will use the network.

The jump to networking was not that sudden. "In 1986," said Sush Patel, GE Nuclear's manager of the infrastructure project, "networking the company was investigated." Patel said the company closely examined protocols such as TCP/IP and cabling schemes such as 10Base-T as well as hardware and software interoperability.

"Nothing was solidly accept-

*Continued on page 50*

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# Users abroad see growing need for ISDN services

BY ELISABETH HORWITT
CW STAFF

While the spread of Integrated Services Digital Network (ISDN) has been slow in Europe, the need for such services is definite and growing, according to a report by Ovum Ltd. and Fischer & Lorenz.

Users interviewed by the two research firms cited the following applications for high-speed, low-cost ISDN switched services: credit-card authorization, document image communications, customer service, electronic data interchange payment services, file transfer, leased circuit backup, personal computer desktop conferencing, image transfer, private voice, telecommuting and videoconferencing.

For early users such as UK-based Crossaig, ISDN services have become a necessity. Crossaig is depending on the proliferation of Pan-European ISDN services as it expands its value-added electronic publishing services to firms throughout the continent. Right now, ISDN is used to produce medical abstracts for a multinational Dutch publisher. Medical journals are scanned in Amsterdam, transmitted to Crossaig's offices, scanned and then transmitted over ISDN links to telecommuting employees who then produce the abstracts. The results are then sent to Crossaig, which makes them available to medical consultants, drug companies, hospitals and researchers.

ISDN services fill at least two crucial links in this process. The low-cost, high-speed switched links enable Crossaig to use telecommuting, part-time employees rather than in-house specialists, resulting in big cost savings. And the ISDN links speed up the transmission of abstracts, cutting total production time from 60 days to 20, Ovum reported.

The lack of intercontinental ISDN is proving to be a stumbling block to the expansion of Crossaig's venture, Ovum said. There is no ISDN-based connection between UK-based British Telecommunications PLC and the Netherlands' Postal Telephone and Telegraph authority. As a result, Crossaig has to transfer files to the Dutch database via modem.

In France, ISDN is widely available but costly, users reported to Ovum. French retail bank Banque Nationale de Paris (BNP) has been involved in an ISDN pilot project to provide credit-card authorization to retailers over ISDN links provided by France Telecom International, Inc. Credit-card authorization takes as little as eight seconds over ISDN, compared with two minutes or more over France Telecom's packet-switched service, Transpac, or the public telephone network, BNP reported. Because all three services charge according to use, the shorter the transaction, the less it costs.

Unfortunately, these cost savings are offset by the cost of ISDN services and equipment, BNP said. ISDN services cost $56 monthly, compared with approximately $6.60 for public telephone service. Furthermore, retailers need to install a dedicated PC, in addition to their existing credit-authorization terminal, to handle the ISDN calls. A terminal that handles both functions is now under development, Ovum reported.

The French government has also limited another potentially popular ISDN application: caller identification. BNP would like to use caller identification to automatically call up the caller's records, to aid its service representatives. However, according to French regulations, extracting a caller's identification is prohibited unless the caller has already signed a contract giving permission.

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# ISDN has ways to go in Europe

CONTINUED FROM PAGE 45

will offer commercial ISDN; however, in some countries, such as Greece, the services will be accessible to a minority of the population, Ovum said.

At the urging of the European Telecommunications Standards Institute (ETSI), some progress is being made toward standardized interconnection between different countries' ISDN services, according to Ovum.

The first phase of the ETSI schedule for ISDN deployment calls for all countries' ISDN services to be connected by December 1993. However, the only type of ISDN service that ETSI is pushing to interconnect at this point is a single circuit-switched 64K bit/sec. B channel.

The second phase, which has no time frame yet, would add packet-switched services on both the 64K bit/sec. B and 16K bit/sec. D channels.

Some countries have already begun the interconnection process. Users in France and Germany, for example, can now communicate with each other via ISDN.

To date, no formal ETSI initiative exists for deploying standardized interconnections for ISDN Primary Rate services between European countries; nor has a standard been developed for such interconnections. Rather than wait for ETSI, a number of European countries have agreed to interconnect their respective 2M bit/sec. switched services.

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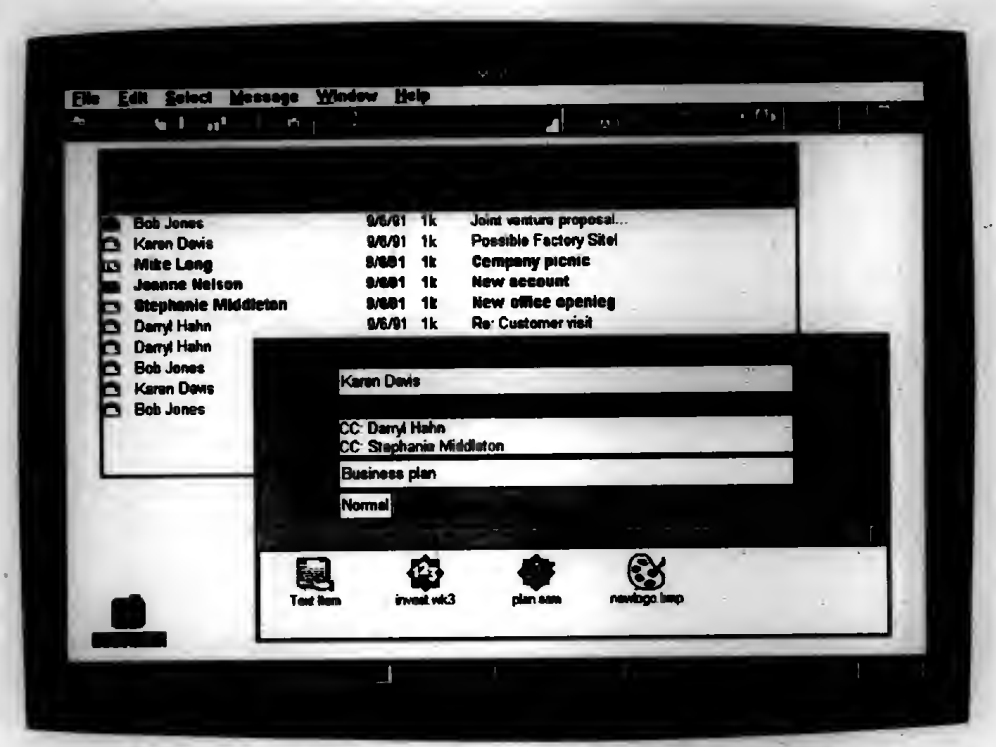


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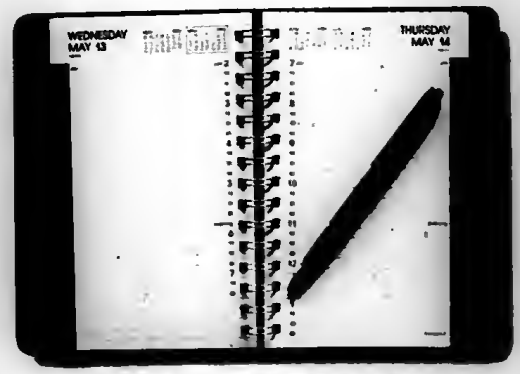


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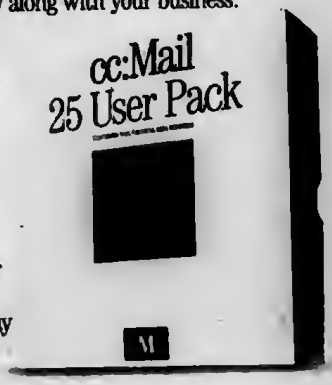


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# Commercial users move onto Internet

ANALYSIS

BY GARY H. ANTHES
CW STAFF

Commercial use of the NSFnet accounts for a tiny but growing part of the network's traffic, and users said the rapidly evolving network is both a blessing and a bane.

The National Science Foundation's (NSF) NSFnet is the backbone, literally and figuratively, of the Internet, a huge, loosely coupled collection of networks supporting collaboration in research and education. The Internet now connects 350,000 computer hosts on 5,000 networks in 33 countries. Several terabytes of information move over it each month, most of it in the form of electronic mail and file transfers.

Traditionally used by engineers and scientists in government and university laboratories, NSFnet has recently attracted the attention of the commercial world, which has not overlooked the possibilities of having bandwidth-on-demand access to some 3 million people at speeds of 1.5M bit/sec. (T1), soon to be 45M bit/sec. (T3).

Several companies have sprung up to respond to this need, among them Advanced Network & Services, Inc. (ANS), a nonprofit partnership of IBM, MCI Communications Corp. and Merit Network, Inc.

"The Internet has been around for 20 years or so, evolving in a leisurely way," said Joel Maloff, client services vice president at ANS. "But in the past year or so, the emphasis has shifted from research to a much broader interest."

### Services aplenty

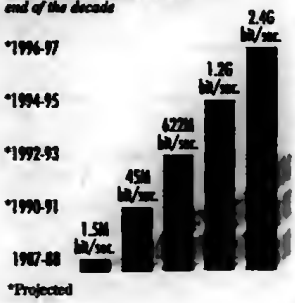
ANS offers a variety of network services including connections to the Internet via the NSFnet backbone. ANS customers include regional and state networks seeking gateways to NSFnet, information providers and firms seeking access to researchers or to their databases.

Through a taxable subsidiary, ANS offers Internet connections free of the government restrictions on commercial traffic. It puts a portion of its after-tax fees from commercial users into a fund used to upgrade the network infrastructure.

The fund allocated the regional networks that agreed to accept commercial traffic from ANS. The firm has 35 customers and has signed up six commercial users since it formed its subsidiary in June, including Union Carbide Corp., Chevron Corp., Abbott Laboratories and Dialog Information Services, Inc.

**Broadband service goals**

*The providers of NSFnet services expect multigigabit transmissions by the end of the decade*




*Projected

Source: Advanced Network and Services, Inc.
CW Chart: Janell Genovese

An information systems manager who asked that he and his company not be identified said 100 people in an internal research group use ANS to exchange E-mail with other researchers on the Internet.

"We could have signed up [directly] with a university for a lot less money and gotten into Internet that way, but with ANS, we have a 24-hour network group we can call. With a university, if something goes down, you have to rely on the good graces of someone to fix it," he said.

The IS manager said his company does not yet use the Internet for file transfer, fearing that it might expose internal systems to invasion by worms or viruses. He said he hopes a new ANS security service — Interlock — will protect the company's networks from unauthorized access by public Internet users.

Another ANS customer is Communications for North Carolina Education, Research and Technology (Concert), a Transmission Control Protocol/Internet Protocol network connecting 6,500 computers at research and commercial sites in North Carolina.

The Concert backbone, made up of 450 miles of microwave circuits, connects to NSFnet via an ANS gateway in Research Triangle Park, N.C.

Joe Ragland, manager of Internet operations at the MCNC Center for Communications, which manages Concert, said Concert previously accessed Internet through Suranet, a regional network spanning a dozen Southeastern states. Now, "for about the same money," Concert shakes hands with NSFnet directly, he said.

Ragland said NSFnet's upgrade from T1 to T3, now nearing completion, has been troublesome for users. "The backbone has had some rocky days, no matter how you connect to it. It hit a low ebb a month or so ago. There was a lot of downtime, a lot of gateway routers crashing. They're getting the problems solved, though."

While the network settles into its T3 groove, more disruptions followed by bigger payoffs are in the offing. ANS, Merit and the NSF have ambitious plans to take the network to above-gigabit speeds in less than five years (see story below). Upgrades that ANS is now designing will enable the network to operate at OC12 (622M bit/sec.) speeds beginning late next year.

Eventually, NSFnet will be replaced by the National Research and Education Network, a gigabit/sec.-plus network for which government-sponsored research is now under way.

# Market rises as prices fall for X terminal crop

BY JOANIE M. WEXLER
CW STAFF

The trend toward client/server computing and plummeting X terminal prices will eventually spur the proliferation of the X Window System protocol in commercial applications. However, it might take corporate computing strategies a while to catch up to the recent avalanche of X product announcements aimed at the business environment.

An X terminal is a stand-alone piece of hardware that comes with X Window System software bundled in. It is diskless, and the X software allows users to pull up applications and data files from other computers in multiple windows on one high-resolution screen. Applications are processed on their respective host computers.

One firm that is considering replacing hundreds of ASCII terminals with X terminals said the evaluation represents "us catching up to the technology. X terminals are also at the point where they are becoming cost-effective for us," said Geoff Tolchin, a senior analyst at Fort Worth, Texas-based Teleservice Resources.

For example, Visual Technology, Inc. rolled out a 14-in. monochrome X terminal last month for $995; at the same time, Network Computing Devices, Inc. introduced a $1,245 15-in. monochrome terminal for users in remote branch offices or for making direct local connections across standard serial lines.

Other X terminal announcements include the following:

- This month's Human Designed Systems, Inc. rollout of a $2,799 to $5,499 line of color terminals based on reduced instruction set computing architecture includes built-in diagnostics and a Simple Network Management Protocol network management agent. The vendor recently won a 50,000 X terminal contract from The Boeing Co., which will reportedly use the terminals in office automation applications.
- NCR Corp. said it will ship next month two "business desktop" models that include an optional 10Base-T local-area network connection and support for local printer attachment.
- Tektronix, Inc. has signed a national reseller agreement with Arrow Electronic, Inc. to distribute its $1,695-and-up line of X terminals to the commercial Unix market.

Value-added resellers "and systems integrators are interested in carrying X terminals now because their customers are asking for them to lower the cost per seat," said Patty Chang, an industry analyst at Dataquest, Inc., a research firm in San Jose, Calif.

She pointed out that the client/server model often requires knowledgeable workers to access multiple resources running on different computer platforms. X is currently the only "glue" available for calling up windows of different applications and data files from disparate hosts on one screen.

For example, Teleservice Resources is evaluating various X terminals for allowing reservation agents access into multiple hotel-chain hosts as well as for other applications. "X is the way we'd have to do it in our multiplatform, multi-operating system environment," he said. "Now, if one agent handles multiple hotels, he must have multiple terminals."

Dataquest estimated that 155,000 X terminals will ship worldwide in 1991, up from 69,000 last year. Approximately 10% of these terminals will go into commercial markets compared with under 5% last year, Chang said.

The X Business Group, a research firm in Fremont, Calif., estimated that there are currently 150 to 200 shrink-wrapped X applications based on graphical user interfaces. Dataquest places about 70 of those as commercial applications.

# GE nuclear networks bloom

CONTINUED FROM PAGE 45

ed as a standard," Patel said.

In the meantime, dumb terminals and desktop computers loaded with terminal-emulation software connected employees via GE Nuclear's IBM and Groupe Bull mainframes.

"We never really bought into the departmental network idea," Carpenter said. "We waited to connect the enterprise." Employees with personal computers could hook up to remote locations using GE Information Services' wide-area network. A few small networks were set up at some of the plants for tasks such as locally transferring files holding engineering designs and optically stored documents.

Again in 1988, GE Nuclear put out bids for an internetworking project, Carpenter explained. "Vendors were saying this or that product will be ready in the third quarter or the fourth quarter," he recalled. Then the vendors would ask when a decision to go ahead would be made.

"Well, since everything I heard from you is going to be ready in the fourth quarter," Carpenter said he told them, "that's when we'll make our decision."

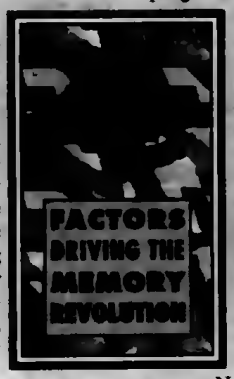
When Phase 1 began last year, Patel said, many of his peers outside the firm were struggling to piece together diverse departmental networks. Today, Patel said, he and other employees are scratching their heads, too, but only while brainstorming to see which parts of their work flow will be automated. Patel said Phases 3 and 4 should be completed by the end of next year. The next two phases, still on the drawing board, will introduce network utilities such as electronic mail and client/server applications.

Carpenter said he expects the entire system to pay for itself "in well under a year." In persuading upper management to sign on to the project, he related the experience of a 25-person department that has used a network to transfer scanned documents. The department, he said, has shown a $13,000-per-week productivity gain.

*Advances in four key areas continue to enhance the capacity, reliability, and performance capabilities of memory products. And it's full-steam ahead into the next century.*

### The DRAM

Today dynamic random access memory (DRAM) continues to be the leading technology utilized as memory media. A new DRAM generation reaches maturity about every three years, with successive generations supplying progressively higher density, greater capacity, faster access time, and lower per-bit price.




Semiconductor technology has also brought more complex, sophisticated "on-chip" functionality to on-board memory support devices. Today, gate arrays and other semiconductor "chips" interface to the system bus, and perform data integrity checking and other critical memory functions — thus working to make memory faster and more reliable.

What's next? Application-specific integrated circuit (ASIC) technology will lead to memory products that can support higher bandwidth and additional built-in functions. An increased number of pins will mean more bits, widthwise on the bus. With an increase in usable gates, memories will be able to integrate a higher degree of interleaving, better ECC codes, and more features for higher availability.

### Printed Circuit Boards

Today's printed circuit boards (PCBs) can support more circuitry in less space — thanks to improved board fabrication and material technology, plus a more controlled etching process.

Changes in device packaging are also boosting memory density. Plastic chip carriers for DRAMs and ceramic pin grid arrays for ASIC devices offer an area that has a greater ratio of silicon to package. This accommodates more storage and allows more functions to be implemented on a board, thus multiplying the space savings achieved via denser DRAMs.

### Surface-Mount Technology

In the past, DRAMs and support devices were soldered to PCBs via a manual manufacturing process. Now, new techniques involving vapor-phase or infrared-reflow processes surface-mount components on both sides of the PCB — nearly doubling capacity for a fractional increase in space.

### Computer Simulation

Gone are the days when engineers designed a memory board with pencil and paper.

Today, engineers create and verify memory designs with computer-intensive tools. The debugging process is accomplished via simulation. Then hardware prototypes are verified against the behavior predicted by the simulations. Advanced tools and techniques work to shorten the product development cycle as well as to improve the design integrity; without them, increasingly sophisticated memory products would be an impossibility.

# REMEMBER:

## New Memory Technologies Can Maximize Your Systems Investment In the Years Ahead

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No doubt these criteria are echoing through your head as you look to select the right system architecture — one that offers flexibility and room for growth.

Think then about memory: The larger the memory capacity, the greater the system growth potential; the greater the variety of memory options, the greater the flexibility. Add more memory to a current system, and you can support more users, run larger applications, and improve response time.

Memory technologies are evolving at a quickening pace. Products are available in smaller packages. Capacities are growing. Per-byte costs are dropping, and speed and reliability are improving.

To make the most of these new technologies, you should evaluate your memory product choices carefully — keeping some key criteria in mind.

### Compliance Means More than Compatibility

You want to be sure the memory products you choose are fully compliant with your system architecture. When designed as an integral part of the architecture, memory products can optimize performance, and ensure data integrity as well as provide correct operation across all operating parameters.

Compatibility isn't enough. The design of "compatible" memories — often called reverse engineering — is typically based on observed nominal conditions in a small sample of systems. The designs emulate the observed behavior of memory subsystems on a limited number of processor configurations. Exception conditions and timing variances between systems are difficult to observe, making it hard to produce fully compliant designs.

Digital's fully compliant memory products enable you to take advantage of system enhancements as they occur. Sometimes compatible memories can't make the transition and become obsolete.

### Reliability Is Key

Business and industry have grown to rely on continual system availability. There is no room for system failure — and that includes memory products too.

Well-designed and tested parts and products are one way to ensure high system availability. For example, to ensure its memory products can withstand adverse conditions, Digital incorporates robust self-tests, fault isolation, and fault repair into its hardware and software systems. The VAX 9000 memory has a built-in scanning capability for testing complex memory control units. In addition, fault management software enables the VAX 4000 Model 300 and the VAX 9000 to map around permanent and transient memory faults.

### More Memory Means More Performance

Configuring the right amount of memory is essential to getting maximum performance from your computer system. Increase the amount of memory, and more instructions and data can reside in memory. This is the fastest form of computer storage, reducing the number of accesses to slower storage devices, such as magnetic disk, and in turn increasing overall performance.

In contrast, insufficient memory capacity results in excessive disk accesses, causing reduced performance and wasted processor resources.

Larger memory capacity better supports applications that place a high demand on memory, such as transaction processing, database management, graphics, and complex modeling. As a good example, during recent benchmarks on a Digital VAX 4000 Model 300 system, 57 more ALL-IN-1 users were supported with no degradation in response time when memory was doubled from 32 MB to 64 MB.

### Keep Digital in Mind

For information and consultation on the memory products best suited to meet your current (and future) system needs, give your Digital sales representative a call. Or call 800-DIGITAL (800-344-4825), ext. 586. (And be sure and ask about our special memory product offers.)

NEWS FLASH

**Two Ways to Save**

**(1) 15% Discount on VAX 6000 Model 600 System Upgrade**

Order a VAX 6000 Model 600 System Upgrade between now and January 31, 1992, and save 15% off the current list price. It's a great way to bring more performance power to your VAX 6000 system — for less.

**(2) VAX 6000/VAX 4000 15% Software Sale**

Now through January 31, 1992, Digital is giving you the chance to match some of the most popular and powerful commercial software with our premier commercial-strength computers — at considerable savings.

Purchase:

- A new VAX 6000 system or upgrade, or
- A new VAX 4000 system or upgrade

and you'll receive a 15% discount on leading software packages from these participating companies:

- Digital (Rdb/VMS Database Administrator's Performance Package)
- Cognos
- Microsystems Engineering Corporation
- Oracle Corporation
- Progress
- Ross Systems
- SYBASE
- WordPerfect Corporation.

**Contact your Digital sales representative for more information. Or call 800-DIGITAL (800-344-4825), ext. 324.**

**Try the World's Leading UNIX Office Software for FREE for Awhile**

Now through March 31, 1992, if you own or purchase a DECsystem 5000 Model 200, DECsystem 5100, or DECsystem 5500, you're eligible to receive a limited-time free trial use of UNIPLEX UNIX-based Integrated Office Software.

UNIPLEX IOS is a Digital Distributed Software product that supports over 200 UNIX, DOS, and ULTRIX hardware platforms — all backed by Digital service. With a full set of integrated office applications, UNIPLEX is designed to tie together users on video terminals, PCs, or workstations.

The four-user trial offer kit includes UNIPLEX II Plus and UNIPLEX Advanced Office System software, UNIPLEX Quick Start Guide, keyboard template, ordering information, and installation instructions.

**For more details, call 800-DIGITAL (800-344-4825), ext. 472.**

**Information at Your Fingertips: SPDs on CD-ROM**

All Digital Software Product Descriptions (SPDs) are now available on a single CD-ROM. A menu-driven interface offers keyword searching, personal filing of one or many SPDs, and ANSI text or PostScript printing capabilities. VMS and DOS users can enjoy this convenient way to find out about Digital products directly; no layered software is needed.

Offered on a subscription basis, the SPD CD-ROM is updated four times a year. A "New Product" command displays all SPDs added since the last update. Online help is also available.

One Year SPD CD-ROM Subscription
Order # ED-00897-18/DU
$125

**To order, call 800-DIGITAL (800-344-4825). For more information, or to inquire about discounts for bulk orders of five or more, call Digital Reference Service at 508-467-4566. Network users contact: INFO_DRS@SALES.DEC.COM.**

## *What prints 13 pages per minute, costs around 2.1 cents per page to own, and fits beautifully into a multivendor world?*

When you have terminals, PCs, Macintosh systems, and workstations, all running different operating systems, it's difficult to provide users with a common printer solution. The net result: a proliferation of printers from different vendors.

Now the DEClaser 3200/3250 family of printers opens the way to a better network printing solution — even if you don't use Digital systems. Here's a sampling of how:

- In a Novell Ethernet networked environment, an optional Novell interface provides direct network connectivity. (A LAT option for direct connection of the DEClaser printers to the network is also available.)
- When used with DECprint Printing Services V4.1, the DEClaser 3250 PostScript-compatible printer can support DDIF, Tektronix 4010/4014, HP-PCL, ReGIS, and ANSI. No other PostScript laser printer on the market today can singularly support these various protocols.
- In Macintosh environments, PATHWORKS for Macintosh allows the DEClaser 3250 printer to function on Apple platforms. (Apple LaserWriter and 43 built-in fonts are supported.)

A host of other features make the DEClaser printers popular with the many users in a networked environment:

- Printing-speed capabilities of up to 13 pages per minute.
- Paper-handling capabilities of up to 2,000 sheets, with the optional 1,500 sheet feeder.
- HP-PCL and LN03 compatibility as a standard feature.
- Standard serial and parallel interfaces.
- Compatibility with PATHWORKS for MS-DOS.
- Duplex printing capability included in base price. (Other vendors charge as much as $1,000 for this capability.)
- Customer-installable, PostScript-compatible upgrade option for the DEClaser 3200.

And, when used with DECprint Printing Services, the DEClaser 3200/3250 printer can be set to PostScript all day, as the software automatically advises when attention is needed (i.e., the paper is out). This allows you to leave the printer virtually unattended.

**Talk to your Digital sales representative or Authorized Reseller for more information on the DEClaser 3200/3250 printers. Or call 800-DIGITAL (800-344-4825), ext. 761.**

# SYSTEMS INTEGRATION:
## *Digital Sets a Leadership Role*

**Max Mayer**
*Manager Digital Systems Integration Services*

When ranking systetos iotegrators, International Data Corporation places Digital Equipment Corporation second, behind IBM. G2 Research ranks Digital third, as does an Input consulting firm survey.

These are certainly solid indicators that Digital Equipment Corporatioo is rapidly emerging as a significant force in the highly competitive worldwide systems integration market.

How did we get there? And what does it mean to you, our customers?

Max Mayer, Manager, Digital Systems Integration Services, answers these and other important questions regarding Digital's role as a leadiog systems integrator.

**Why is Digital in the systems integration business?**

There's been a big change in the industry over the last five years or so. Customers increasingly have requested that their vendors take on a different kind of role — to help them integrate technology with their husiness and their people. Digital has responded to that.

Providing the traditional point-product solution isn't enough anymore. Customers want total solutions. For us at Digital, systems integration is a natural extension from where we've been for more than 25 years. By its very nature, systems integration implies "multivendor." And, when it comes to toultivendor solutions, Digital is widely recognized as a proven innovator.

**What strengths does Digital bring to the table?**

Expertise. Finaneial capability. Global capacity. And momentum. We are committed to supporting open systems with open technology, open business practices, and open services. This means working to toeet your organization's precise husiness goals, ptoviding coosistent, high-quality multivendor support. We "humanize" services, with personalized customer-specific support and tailored training solutions.

We've come a long way in the three years sinee the annouocement that positioned us formally into the systems integration business. In fact, our systems integration husiness has been growing at a rate 50 percent faster than the market overall. We have toore than 400 systems integration program managers in place, with the capacity to add 700 to 1,000 more. We've developed toore thao 70 Application Integration Sets, which are applicatioo platforms that provide the foundation for systems iotegration solutions.

Another strength is our working relationship with other solutions providers. Through our Digital Service Alliance (DSA) program, we've teamed with key partners, such as Andersen Consulting, Price Watethouse, Computet Sciences Corporation, and others. This open business practice has enabled us to readily deliver a full spectrum of services — complementing Digital's multivendor solutions.

**How do you manage your systems integration business?**

We have two business processes in place to help us define and deliver cotoplex systems integration solutions.

First, we work through what we call our Integration Framework, mapping out the planning, design, implementatioo, and management of a systems integration ptoject. The Integration Framework is a conceptual approach to identifying customer needs and Digital's corresponding capabilities. It is not a product but a tool to appropriately and effectively relate information technology architecture to a customer's business.

Next cotoes the Digital Prograto Methodology, which is a structured method for professiooally managing complex programs io a systematic way. This is a six-step process: definition, analysis, design, implementation, installation, and operation.

The Digital Program Methodology is backed by a series of professional functional disciplines, including consulting, software design and development, training, operation, and maintenance.

**Frameworks. Methodologies. This sounds very rigid.**

On the contrary, the power of our approach is that it allows us to modularize and tailor to what the customer needs. We can step in at any part of the program and work from there. We're orieoted toward a total solution, and our defined processes help us keep the hig picture in view.

**What are some of your successes?**

Currently we have major systems integration programs in process with customers such as Banker's Trust, Barclay's Bank, Boeing, Eastman Kodak, Nissan, Quotron, Tyson Foods, and Toys "R" Us.

Other projects include a recent teaming with Computer Seiences Corporation (CSC) to bring a fully integrated project and document management system to the packaging division of a leading U.S. manufacturer.

We've been brought in as management coosultants to work with a specialty ehetoical company on developiog an entirely new husiness model and then definiog the informatioo architecture that fits that model.

And we also just made a significant win io the datacenter arena, when one of the largest independent steel distributors chose Digital to manage a major outsourcing project aimed at tripling the firm's computing power and quadrupling disk storage over the next six mooths. The project will htiog the company's diverse applications on to VAX 9000 systems, eventually replacing an outsourced IBM 3090 mainframe.

**How do you rate Digital versus your competition?**

Quite frankly, on a global basis, I don't think anyone can match our capabilities and infrastructure.

On a local hasis, we do have quite a few competitors. On the joiot ptoject with Computer Sciences Corporation I just mentioned, for example, our competitors included an Andersen/Sun team, a Hewlett-Packard/Coopers team, as well as IBM and Apple.

However, I believe we provide the hroadest range of innovative capabilities coming from a single vendor — across the complete plan, design, implement, and manage framework. A number of players will offer service in one of those categories. Digital can provide services across the full spectrum.

**Isn't it quite likely that today's competitor might well be the next day's SI business partner?**

Well, yes, that's true, and it poses an interesting set of challenges. But in the real world, this is exactly how things are. We must work out relationships among ourselves, while keeping customers' needs foremost in the process.

Here again Digital has a lot of experience; we've been working side by side with our competitors io multivendor environments for nearly 30 years. While systems integraoon is more complex and involved, the principles are the same. Maturity is tequired, as well as the willingness to do things differently.

**An ADAPSO board member was quoted as saying: *"When we asked which companies will be important in the SI market over the next five years, survey respondents listed the most competitive future force as Digital Equipment Corporation."* Where do you see Digital's system integration business in the next five years?**

Working as a team with our customers and service partners, we have set a goal to be the number one, world-class systems integrator. We aim to set the standard by which systems integration is judged. It's important to understand that does not mean number one in size. It means oumber one io quality. And, yes, in profitability. Most important, it means number one in customer satisfaction.

Due to n lack of photographic contrast, this page did not reproduce well.

# NAS Products

## Make It Easier to Implement Open Client/Server Computing

As you no doubt know, NAS (Network Applicatinn Support) is a set nf standards-based software products wbich enable users to access and share applications across a multivendot computing environment.

But did you also know that there are now over 2,400 applications built nn NAS software from Digital and mnre than 1,000 CSOs worldwide?

With our recent announcement of six new NAS products, you can easily purchase exactly the right cnmbination nf NAS software products to address your open systems and client/server computing needs.

**Bottom Line:**
**We're Talking about Easy and Cost-Effective Investments**

The new server products — NAS 200 and NAS 300 for both VMS and RISC ULTRIX, NAS 400 for VMS, and NAS 250 for new VAX workstations — provide a powerful and consistent software envirnnment across different nperating system platfnrms. Eacb product package has nne order number, one license, one installation, one media and documentation kit, and nne support contract — all at an attractive price.

And now for more details.

**NAS 200**

The NAS 200 server for VMS and RISC ULTRIX enbances distributinn and management capabilities, enabling users to integrate tbeir desktnps by sharing files and data within a work group and by accessing local and remote ptinters frnm any cnmbinatinn nf PC and Macintosh systems, as well as VMS nr UNIX workstations.

Specific features nf the NAS 200 include: network transports; distributed computing services; print, file, and data sharing; and management services.

**NAS 300**

The NAS 300 server fot VMS and RISC ULTRIX provides full client/server software fnt distributed applicatinns and data. Fncused nn enhanced intetnperability, the NAS 300 enables users to access and run applications from different PC, Macintnsb, VMS, and UNIX systems, and to access remote databases and integrate information locally. The NAS 300 also makes it easier tn share, send, and receive multimedia documents, and to run applicatinns which transparently access other applications.

Specific NAS 300 features include: distributed user interfaces, compound document capability, object linking and control, interprocess messaging, and full data integration, plus all the features of the NAS 200.

**NAS 400**

Focused nn higher availability and reliability, the NAS 400 for VMS ensures that mission-critical applications and data are always current, wbile allnwing transactinns nn tbat data tn take place as needed from different desktop systems.

Specific features nf tbe NAS 400 include perfntmance tuning, capacity planning, shadnwing, jnurnaling, and transactinn processing, plus all the features of the NAS 300.

**NAS 250**

The NAS 250 is a full complement nf NAS software included with all the new VAX 4000 workstations. The NAS 250, in conjunction with our PATHWORKS suite of products fot PCs and Macintosh systems and our ULTRIX Wnrkstation Software (UWS), provides the key software required tn link a full range nf desktop systems to participate fully in a client/server environment.

**And Consulting Services Too**

In addition to offering the NAS products themselves, Digital provides a full range of suppnrt services, including Open Consulting Services for NAS, for guidance on planning and implementing your open, multivendor computing environment.

**For more details about the new NAS products, including information about a special offer, call 800-DIGITAL (800-344-4825), ext. 766.**

| NAS 200 for VAX VMS |
|---|
| MicroVAX 3100 Platform<br>Order # QL-MC1AP-AA<br>$1,120 |
| VAX 4300 Platform<br>Order # QL-MC1A2-AA<br>$5,200 |
| VAX 6610 Platform<br>Order # QL-MC1AD-AA<br>$11,300 |
| **NAS 200 for RISC ULTRIX** |
| DECsystem 5100 Platform<br>Order # QL-XVCAN-AA<br>$2,720 |
| DECsystem 5500 Platform<br>Order # QL-XVCAS-AA<br>$4,730 |
| **NAS 300 for RISC ULTRIX** |
| DECsystem 5100 Platform<br>Order # QL-XVAAN-AA<br>$4,610 |
| DECsystem 5500 Platform<br>Order # QL-XVAAS-AA<br>$7,480 |

| NAS 300 for VAX VMS |
|---|
| VAX 4000-200 Platform<br>Order # QL-MC2AB-AA<br>$8,210 |
| VAX 6000-610 Platform<br>Order # QL-MC2AD-AA<br>$30,300 |
| VAX 9000-410 Platform<br>Order # QL-MC2AV-AA<br>$43,300 |
| **NAS 400 for VAX VMS** |
| VAX 4000-300 Platform<br>Order #QL-MC5A2-AA<br>$41,410 |
| VAX 6000-610 Platform<br>Order # QL-MC5AD-AA<br>$89,500 |
| VAX 9000-410 Platform<br>Order # QL-MC5AV-AA<br>$128,300 |

# Need to Enhance I/O Performance? Try DECram

*And what is DECram?*

DECram for VMS V1.0 is a software product that allows a VMS system manager to create and manage pseudo disks (RAM disks) that reside in VAX main memory to improve I/O performance. The user can read from and write to a DECram disk, using standard VMS disk I/O operations, at access times much faster than standard hardware disks.

DECram was used within Digital for over five years before recently being announced as a VMS layered product.

**Ideal for Read-Only and Temporary Scratch Files**

Data placed nn a DECram disk is volatile. Therefore, DECram is ideally suited for improving the I/O performance of read-only files and temporary scratch files. In this application, if a system outage occurs, there is no loss of any critical data or results.

With the use of VAX RMS Journaling, critical files moved to a DECram device can be journaled to allow for recovery after a system failure.

**Applications Need Not Change**

You can use DECram without changing software applications or system software — because DECram disks are accessed through the VMS file system the same way physical disks are accessed.

**It Works In a Cluster Too**

DECram devices can be used as local devices on nodes within a VAXcluster. (However, DECram devices are not served to a VAXcluster nor can they be used as a shadow member.)

**To place an order, or for answers to any technical questions you may have about DECram, call 800-DIGITAL (800-344-4825), ext. 512.**

**DECram ORDERING INFORMATION**

DECram for VMS V1.0 Software License
Order # QL-GJ9A*-AA
$500 to $25,900
*Processor type

DECram for VMS V1.0 (TK50)
Order # QA-GJ9AA-H5
$130

DECram for VMS V1.0 (1600 MT9)
Order # QA-GJ9AA-HM
$130

Note: DECram for VMS documentation is available on the media kit only.

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NEW PRODUCTS

## Electronic mail

Enable Software, Inc. has announced the Exchange Monitor module for its Higgins E-Mail product line.

The Exchange Monitor ($995) alerts the network administrator in the event of a failure in the system's wide-area electronic mail distribution. It bypasses the mail system and uses the network operating system to deliver an alert message.

**Enable Software**
**Suite 101**
**1150 Marina Village Pkwy.**
**Alameda, Calif. 94501**
**(510) 865-9805**

## Gateways, bridges, routers

Ideassociates, Inc. has announced a local-area network gateway for multiple concurrent personal computer communications sessions with IBM mid-range and mainframe hosts.

The Ideacomm Gateway includes Ideacomm Host Link Adapter Cards (HLAC) that are installed in the gateway PC. Up to four HLACs can be installed in a single host. Ideacomm software allows users on the LAN up to 10 concurrent sessions with different hosts.

Ideacomm HLACs cost $625 or $655 for a Micro Channel Architecture version. A single user license for the software costs $395.

**Ideassociates**
**29 Dunham Road**
**Billerica, Mass. 01821**
**(508) 663-6878**

Communique, a line of communications servers connecting Ethernet local-area networks to wide-area networks and remote services, has been introduced by Uconx Corp.

The servers are programmable and configurable, allowing users to optimize the system for their needs. Communique products support X.25, High Level Data Link Control/Synchronous Data Link Control and other communications protocols.

Pricing for the servers starts at $10,000.

**Uconx**
**6540 Lusk Blvd. C-113**
**San Diego, Calif. 92121**
**(619) 546-9232**

## Local-area networking hardware

Tutankhamon Electronics, Inc. has announced Magicnet, a low-cost local-area network that uses common telephone wire.

Magicnet works with all Ethernet equipment, the company said. It includes four- and eight-port Magicnet Hubs, priced at $475 and $895 respectively, and the Magicnet Assistant Network Manager, priced at $99. The system can link up to 30 network devices.

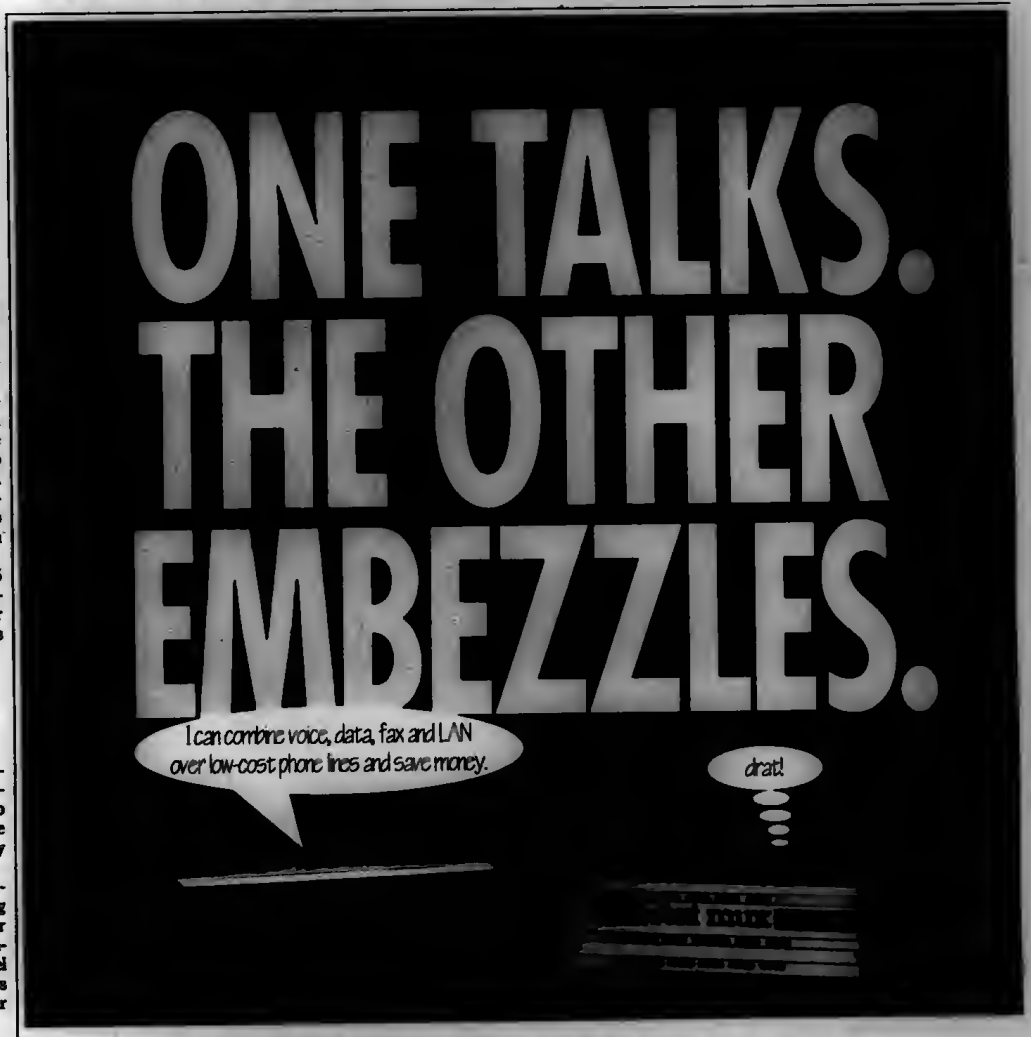
**Tutankhamon Electronics**
**2446 Estand Way**
**Pleasant Hill, Calif. 94523**
**(415) 682-6510**

Thomas-Conrad Corp. has announced 100M bit/sec. TCNS network adapters and smart hubs for shielded twisted-pair and coaxial cable.

According to the company, the TCNS products offer high-speed desktop connections for users with installed Token Ring and Arcnet network cabling. Drivers are available for a number of common network operating systems, the company said.

The copper-based adapters cost $745. TCNS copper-based smart hubs are priced at $1,995 and include a coupon for a free copy of the company's Hubtalk remote network hub management software.

**Thomas-Conrad**
**1906R Kramer Lane**
**Austin, Texas 78758**
**(512) 836-1935**


Time was, the old stat mux was the best way to save money.

Those days are gone. Your data-only multiplexor is costing you lost savings every day you use it.

For about the same price as a stat mux, you can now buy a data/voice network server able to combine remote voice, data, fax and LAN traffic over one low-cost leased line at speeds from 9.6K to 56/64 Kbps. It's called Marathon 1K and it's a breakthrough in technology and fast payback.

Using the same private line for voice and fax as well as data and LAN traffic can save big bucks month after month on phone company toll charges. So Marathon 1K can pay for itself in just a few months, and after that all the savings go to your company's bottom line.

Products that don't save your company money are no more than profit robbers. Get Marathon instead.

Call for a free compressed voice demonstration or attend a Data/Voice Integration Workshop. Call toll-free (800) MICOM US (642-6687) or (805) 583-8600. Fax (805) 583-1997. Canada: (800) 932-DVNS.

Call today and stop wasting money.

MICOM®

See Marathon live at DEXPO Fall, booth number 511.



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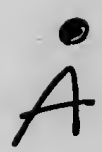
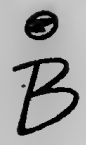
with your computer/modem




# We sell straight lines.

These days, companies are being forced to draw the line.

Frustrated by mounting competitive pressures and nagging productivity concerns, they are reexamining their fundamental business approaches.

They are realizing that information technology can shorten the distance between themselves and their goals.

And Andersen Consulting is helping them connect the dots.

By combining business intelligence and technological command, Andersen Consulting can offer strategic solutions that help drive a company forward.

And that's not just some promising theory.

Our techniques have already tangibly improved company performance in industry after industry. At Andersen Consulting, it's what we call thinking straight.

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**Where we go from here.™**

# MANAGER'S JOURNAL

MANAGEMENT SHORTS

## Peterson joins board

**DuWayne J. Peterson**, retired chief information officer at Merrill Lynch & Co., has joined the board of directors of communications equipment vendor **Network Equipment Technologies, Inc.** in Redwood City, Calif. Peterson, 59, has formed his own consulting firm in Pasadena, Calif.

**Florida Power Corp.** in St. Petersburg, Fla., and **Andersen Consulting** have agreed to a three-year applications development deal. The two firms will jointly develop what is said to be the utility industry's first cooperative-processing customer information system software. Andersen will own and market the software, to be called Customer/1 Cooperative. It will be a workstation-based version of the IBM DB2-based Customer/1 system released a year ago.

**Master Data Center, Inc.**, a software development subsidiary of publishing house **Simon & Schuster, Inc.**, has signed a three-year deal to outsource computer operations to the **Genix Group**. The contract is worth $750,000. Master Data Center develops and markets legal applications software that manages patents and trademarks.

**The Data Processing Management Association** has elected six officers for 1992. The elections were held at the association's conference in New Orleans earlier this month. The officers and their companies follow: executive vice president: Howard L. Smith, HLS Enterprises, Concord, N.C.; secretary-treasurer: Dorothy Deran, Syntex Research, Palo Alto, Calif. Association vice presidents are Michael J. Galaty, Pitney Bowes, Inc., Stamford, Conn.; Robert T. Coyle, Sears Roebuck Acceptance Corp., Greenville, Del.; William R. Reaugh, Caterpillar, Inc., East Peoria, Ill.; and William R. Lackey, WRL Data Systems, West Palm Beach, Fla.

# Moving to open systems — carefully

*EG&G toes line between cutting edge, complacency as it replaces proprietary systems*

BY MARYFRAN JOHNSON
CW STAFF

The leadership style that Bob Curran lightly calls his "schizophrenic approach to management" is stretching in new directions these days at EG&G, Inc. in Wellesley, Mass.

As corporate director of information systems and telecommunications at the sprawling electronics and high-tech components firm, Curran is charged with moving the Fortune 200 company away from proprietary software and systems toward open systems and Unix-based workstations.

"As upgrades come up, whether they're in computer-aided design or administration, our first choice is open systems technology," Curran says. "We're taking an evolutionary approach rather than replacing what still works for us. The philosophy behind our plan — and I kid our people about this — is not to ride the leading edge and get cut to pieces by it but to use the leading edge to our benefit."

Steven Lewis

**EG&G's Curran:** *'We're taking an evolutionary approach rather than replacing what still works for us'*

The dominant hardware vendors in EG&G's new scenario are Hewlett-Packard Co. and Digital Equipment Corp., and Curran is currently pushing his major manufacturing software vendor — Ask Computer Systems, Inc. — to adopt a Unix version of its product more quickly.

"EG&G may be better suited for this open system evolution than a lot of other companies because we do not do in-house software development unless it's strongly justified," Curran says. "Our corporate policy says, 'Buy commercial packages and use them unmodified.' "

With 35,000 employees worldwide in more than 50 diverse business units, EG&G posts annual sales topping $2.4 billion. Its business spans the design and manufacture of laboratory and field-test instruments, electronics and mechanical components to site management work at major U.S. government facilities such as Kennedy Space Center and NASA's Langley Research Center.

EG&G's customers include hundreds of technical and scientific companies as well as government agencies. At airports throughout the country, for example, about 80% of the ubiquitous security X-ray devices hail from EG&G.

Curran joined EG&G in the summer of 1990 after eight years as executive director of computer services and telecommunications at Tufts University, where he built a reputation for fostering cooperation between two factions frequently at odds: academic and administrative computer users [CW, April 10, 1989].

"One of the things I learned at the university was what I call a schizophrenic approach to management," he recalls. "On the one hand, you have to

*Continued on page 58*

# Bank finds ways to put IS quality to the test

BY JEAN S. BOZMAN
CW STAFF

Quality of information services, as an attribute, is easy to recognize — but awfully hard to benchmark.

However, one of the nation's largest regional banks has taken on the task of benchmarking the quality of the information systems services it provides to its organization.

The benchmark for First Union National Bank, a Charlotte, N.C.-based regional bank with assets of $49 billion, is being developed by an independent consultant. It is based on customer satisfaction surveys of end-user departments.

"Our uptime is consistently in the 98% range, and we're proud of that. We've even bragged about it," said Judge Fowler, a senior vice president of the bank's Automation Division who oversees all systems development. "But we have to create a culture that says 98% is not good enough. We've estimated that even that 2% of downtime results in 30,000 customers inconvenienced each month."

The quest for quality began last year, when First Union's top management promoted quality as a competitive advantage against other large regional banks, such as NCNB Corp. in Charlotte and First Wachovia Corp. in Winston-Salem, N.C.

In search of role models, Fowler visited IBM's Rochester, Minn., factory for Application System/400s, Xerox Corp. and textile maker Milliken & Co. — all of which have won the coveted Malcolm Baldrige National Quality Award.

### Never-ending process

"We found a theme of measuring the existing quality, fixing what's broken — and then doing it all over again in a never-ending quality improvement process," Fowler said.

To measure IS quality, First Union commissioned Towers Perrin, a New York-based employee-benefits consulting firm, to develop a survey that would quantify IS services. Now that the survey has been prototyped, First Union has invited other companies to participate in the quality benchmark study.

So far, First Union has surveyed more than 100 of its own 25,000 employees about IS satisfaction.

If other IS groups jump on First Union's quality bandwagon, the profile and efficiency ratings of their IS operations will be stored in a database at Towers Perrin. Then, those ratings will be compared to those of other IS organizations in various industry segments.

Participants would have to pay $10,000 to $20,000 to Towers Perrin for the survey, said Thomas Davenport, a principal consultant based in San Francisco. "First Union has funded the development of the survey," Davenport said. "What other firms will get is a comprehensive analysis of customer satisfaction with their MIS shops."

COMMENTARY

*Walter Ulrich*

# IS: Change your ways

The waves of change sweeping the globe today are creating havoc in the traditional business world. Deregulation and liberalization are removing legal and regulatory barriers behind which inefficient operations were able to hide. In this process of industry restructuring, everything is fair game: people, underutilized assets and even management functions such as information technology.

This pressure to redo the way our companies work also applies to information technology management itself. We, too, must change the way we do our jobs. Although technical mastery is still important, the challenge for those of us in the information technology field is to make sure business managers understand how technology can improve the bottom line.

The new organizational reality requires a rethinking of IS approaches. Companies must reengineer their business processes and develop a technology architecture. A technology architecture is a road map for guiding future information technology investments. It shows companies the following things:

- How to distribute applications across multiple platforms.
- How to put these platforms close to users.
- How to match emerging technologies to specific business needs.

Five information technology principles guide the design of the technology architecture.

1. The first principle is to build functionally driven systems. Traditional practice has been to mechanize the manual processes of the old organization. The problem with this approach is the organizational structure often changes, and the systems cannot keep up.

The answer is to build systems around the fundamental functions. For example, in a manufacturing company, the fundamental functions would be to develop the product, build the product, distribute it and sell it. Any company in the manufacturing business must perform these functions; therefore, this is a stable foundation on which to build information systems.

2. The second principle is to use enterprisewide data concepts. The classic example is the old-line insurance company that sold life, auto and home insurance. Each group thought of its unit as having accounts. The problem was, if you had a home insurance policy, the life insurance account system was totally unaware of this fact, and there was no opportunity for cross-selling. Today, we think not of "accounts" but of "customers," and we sell to the entire customer's needs.

3. The third principle is to build knowledge into the systems. We have empowered workers. Expertise that used to reside in many layers of specialists now must be built into the computer system and communicated easily and effectively.

4. The fourth principle is to develop an advanced computing environment in which to build applications. In the future, companies will move toward total connectivity, both internally and with customers and suppliers. Future information systems will consist of smart networks supporting cooperative, distributed processing.

The host-based model for applications such as E-mail is obsolete. LAN computing is an important bridge between the host-based computing paradigm of the 1980s and the client/server computing paradigm of the later '90s.

5. The fifth principle is to extend the first four principles outside your organization to your best customers and most critical suppliers. Optimize partnership functionality, share partnership-wide data, use collective knowledge to enhance intelligent systems and link technology architectures using standard interfaces and, where possible, common building blocks.

Technology can make a difference. But management is often so preoccupied with competitive and financial issues that it overlooks the enormous contribution technology can make.

Your job is to demonstrate the enabling role of technology. Identify a real business need, and figure out how information technology can help meet it.

For example, you can show that optical character recognition can dramatically cut data entry costs. Or, you can show that voice annotation can be used to allow verbal comments to accompany a document wherever it goes.

You can demonstrate how imaging systems can save paper and still maintain a legal record for past transactions. And you can explain how expert systems can enhance a customer service representative's contacts with customers.

Most of these examples seem obvious, but you'd be surprised how many senior managers don't understand the technology, what it can do for them, and what its limitations are. You have the knowledge and the power to match your business needs to the technology.

The technologies available today are fabulous. The opportunities to apply the technologies to solve vital business problems are outstanding. Despite — or perhaps because of — all the change and chaos, this is an exhilarating time to be an information technology professional.

Ulrich is the director of consultancy at Arthur D. Little, Inc.'s Los Angeles office.

# Moving to open systems

CONTINUED FROM PAGE 57

provide a degree of leadership. But you do it while allowing people a degree of participation."

As the technology choices steer EG&G toward open systems, Curran is engineering a more profound change in the IS organization as well. His task is to merge a half-dozen technology management groups into a coordinated and cooperative team.

EG&G divides its corporate self into six major divisions: instruments, components, technical services, aerospace, defense and U.S. Department of Energy support.

Each division has long been accustomed to near-autonomy, choosing its own computers and running itself much like an independent business.

**Getting involved**

"In the past two years, corporate has gotten involved in things it never was before," says Regina Wiedenski, an analyst who follows EG&G for Adams, Harkness & Hill in Boston. "They're trying to foster a spirit of cooperation."

For corporate IS, that requires diplomacy as well as technical expertise. "We have to convince the divisions that the standards we establish, such as looking at open systems, will work for them," Curran says. "We can't just dictate it."

In early September, Curran held the company's first internal Information Technology Conference, drawing some 50 IS managers to the corporate headquarters in Wellesley. The principal speaker at the three-day conference was Ken Sills, director of customer service at the Open

Steven Lewis

*Curran doesn't want the cutting edge to bleed his company*

Software Foundation in Cambridge, Mass.

"One very strong message I tried to convey to EG&G was that open systems is not just Unix anymore," Sills says. "The open systems movement is not something that gets solved and then we all declare victory and do something else. It's an evolving and long-term effort."

EG&G's evolutionary shift toward open systems is a common approach for companies in highly technical fields, Sills observes. "In a lot of cases, open systems and Unix within a company starts in the technical workstation area, in the design shops and engineering shops. Then all of a sudden, there's a need to integrate it into manufacturing or the financial systems."

EG&G Chief Executive Officer John Kucharski also had a message for his IS executives. "He told us there is too much data and not enough real information," Curran recalls. "All of us recognize that problem, which is why we need to use information technology to manage instead of using data processing to create more data."

Overall, the IS budget runs roughly 2% of total sales — in the neighborhood of $200 million annually — yet the IS staff numbers fewer than 200 throughout all of the commercial divisions. "We run very lean," Curran says. The corporate IS staff, for example, includes only nine people and relies on a handful of DEC machines for departmental computing.

Adopting open systems should ultimately make EG&G more flexible, Curran says. "We want to be able to take advantage of the software and hardware developed with the newer techniques, which reduces development time and makes it easier for users to implement. That's a good strategy no matter what way you cut it."

At this point, the company is only at the ground-level stages of its open systems project for the commercial divisions, although its engineering departments have been actively moving to Unix platforms.

"We've been watching this for quite a while, but it's only in the last year or so that there's been a significant increase in commercially available software for administrative applications," Curran explains.

Although EG&G has been a longtime user of Ask's Manman manufacturing resource planning software, Ask has been moving too slowly with its Unix version of Manman, the IS director notes. In the meantime, EG&G is examining three competitive Unix manufacturing packages: Chess from Xerox Corp., Minxware from Minx Software, Inc. and the Triton system from Leland Baan Corp.

One early success story that Curran points to is at EG&G Wakefield Components in Wakefield, Mass., which recently moved off proprietary software and onto HP computer-aided design applications running on HP 9000 Unix-based machines. Cooperative work with HP and the resulting efficiencies of the new systems "significantly contributed" to EG&G's winning a recent manufacturing contract from Pioneer Manufacturing Co., Curran says.

## Tough customer

When it comes to dealing with vendors, EG&G's corporate director of IS and telecommunications takes a no-nonsense stance. Bob Curran tells them what his company needs, and he expects a brisk response.

"We want to work with our vendors, and we're interested in giving them input on how we want to use their systems," he explains. "The best way to use your vendors is know what you need and tell them about it." A prime example is Curran's prodding of Ask Computer Systems to develop Unix versions of its manufacturing applications.

Both HP and DEC were recently called on to hustle up a single marketing representive to handle EG&G business in the U.S. and abroad. "We didn't want to be bouncing back and forth between two marketing reps," Curran says.

User-based pricing rather than platform pricing is of keen interest to EG&G as well, as vendors such as Oracle Corp. know only too well. "We had slowed down purchases with Oracle because of [pricing issues]," Curran says. "They are addressing that issue for us now, although we haven't finalized anything."

MARYFRAN JOHNSON

Executive

Finance

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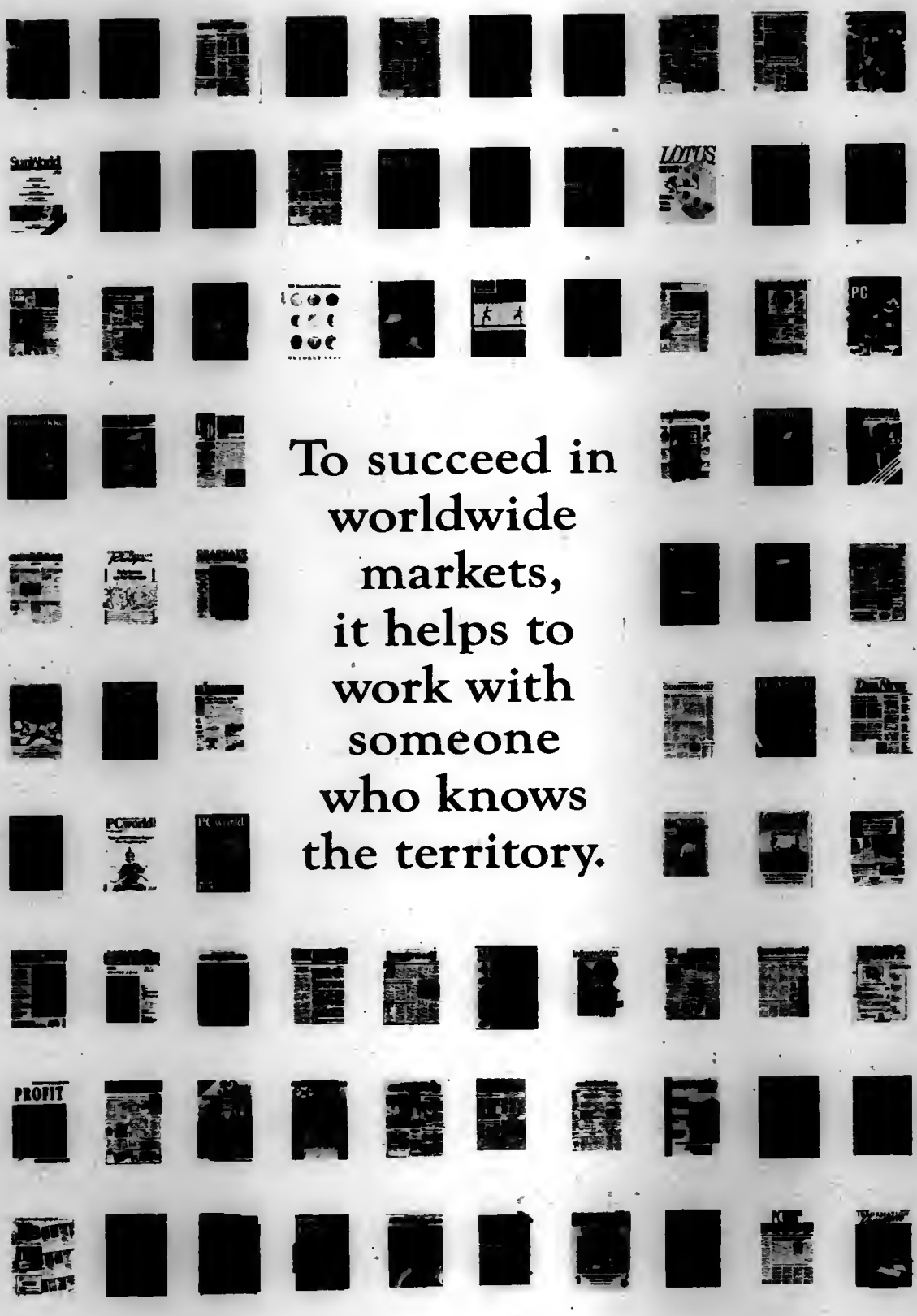


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BOOK REVIEWS

## Cramming the world into a shoebox

**Mirror Worlds**
By David Gelernter
*Oxford University Press, $24.95*

*Mirror Worlds* offers an unusual, thoughtful perspective on technology, and the writing is nothing short of fantastic. The reader will need to come up for air periodically, but *Mirror Worlds* is worth the work.

"Mirror worlds" are gigantic software models that mirror our environment in minute, real-time detail — hence the subtitle, *The Day Software Puts the Universe in a Shoebox . . . How It Will Happen and What It Will Mean.* What that means is that anyone with a computer terminal could plug in and find out the price of peas at the corner market or the current health of the nation's educational system. Mirror worlds are also a platform for obtaining services and interacting with other on-line explorers.

Gelernter, an associate professor of computer science at Yale University's Department of Computer Science, argues that working mirror worlds are inevitable and should be in place on some reasonably large scale before the turn of the century. Gelernter describes the necessary technology and techniques for building these gigantic models, mixing in the practical and the theoretical.

The discussion starts with the question "What is software?" Information systems professionals may find this section somewhat elementary, though Gelernter throws away the conventional definition and pursues a more philosophical understanding of software.

The author (fortunately) has a great talent for amusing analogies that make abstruse ideas more readily understood. His witty, conversational tone draws the reader through: A section on the social impact of mirror worlds bears the headline, "Sounds like fun, but so what?"

He also tosses some sardonic observations about society into the mix: "The Administration's new five-year highway plan calls for wider use of tolls. How about more potholes, too, while you're up?" Rather than being distractions, these asides make for a more readable book.

DEREK SLATER

**Project Management Made Simple: A Guide to Successful Management of Computer Systems Projects**
By David King
*Yourdon Press, $30*

This thin, clearly written volume won't replace any of the tomes on project management now available, but it may be a good place to help you decide which of the more in-depth books will serve you best.

The author has boiled down a huge amount of information about project management and produced just over 100 pages of flowcharts, diagrams and lists with the goal of giving project managers a framework on which to build.

Easy-to-understand chapters cover such topics as "What is Project Management?" and "Life Cycle Stages and Estimating." A chapter called "The Future of Project Management" even gives some hints as to what project managers should be prepared for in the future, including the fact that life cycle stages will be combined into one single design and implementation stage, thanks to the combination of graphic and voice-oriented user interfaces with object-oriented development.

CHRISTOPHER LINDQUIST

**McGraw-Hill Dictionary of Wall Street Acronyms, Initials & Abbreviations**
By Jerry M. Rosenberg
*McGraw-Hill, Inc., $12.95*

It's true . . . there are only a handful of shopping weeks left before the holidays.

Which means that, before you know it, fourth-quarter earnings announcements will leave you shoveling your way through a blizzard of Wall Street words and phrases that you still don't understand.

Don't panic. Just in time for both events, McGraw-Hill, Inc. and Rutgers University management professor Jerry M. Rosenberg bring you this simple-to-use (all you have to know is the alphabet), easy-to-carry and affordable dictionary. The book seems a good bet for all who deal with the world of finance but have never quite cracked the language barrier.

While a quick trip into Rosenberg's book is guaranteed easy going, readers may not come away equally satisfied. Why? Some Wall Street acronyms stand for more than one thing. Thus, the user who dashes to look up what RFQ means will find immediate satisfaction: It stands for request for quotation. On the other hand, UP can mean uncovered position, unearned premium, unit price, upset price or Union Pacific (railroad).

This problem could have been resolved — or at least largely abated — by supplying even a small amount of contextual explanation. But, hey — that would have detracted from the book's brevity and simplicity. Why mess with a good thing?

NELL MARGOLIS


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# Ready, willing and able?

*New federal laws barring discrimination against persons with disabilities go into effect in January. How ready is your company?*

Guy Kelvey

**University of Texas' Watkins:** *Many expect the workplace impact of the Americans with Disabilities Act of 1990 to be on a par with the Civil Rights Act*

BY MITCH BETTS and JEAN S. BOZMAN

Ten years after the first personal computer revolution, a second movement is under way that advocates say could usher in a new era of employment for workers with disabilities. However, when a new federal law mandating that businesses make "reasonable accommodations" for disabled employees goes into effect in 1992, many U.S. companies and their information systems departments will not be ready.

Experts say the Americans with Disabilities Act (ADA) of 1990 will require changes in everything from computer interfaces to voice mail so that technology does not create barriers for physically, emotionally and mentally impaired people who would otherwise be qualified for a particular job.

The far-reaching law does not spell out exactly how companies must comply. Instead, employers are asked to make decisions about equipping the disabled on a case-by-case basis. But experts say that employers who think a few wheelchair ramps will satisfy the nation's latest civil rights law had better take a second look.

In general, companies will need to provide office technology with audio interfaces for blind workers and visual interfaces for deaf workers, says Samuel A. Simon, president of Issue Dynamics, Inc., a consulting firm in Washington, D.C.

For instance, a voice-mail system used to announce essential company meetings discriminates against the deaf worker, he says, noting that "technology is both a barrier and a solution."

Other experts say firms will probably need to provide computer screen readers for blind workers and touch screens or other interfaces for those who cannot use keyboards. Employers may be required to provide a vision-impaired worker with special eyeglasses for use with VDTs.

### Little action so far

Despite the vast number of technical, managerial and training issues the law implies, observers say many U.S. firms have done little or no planning regarding the "adaptive technologies" needed to bring impaired workers into the business mainstream. While many companies are tracking the legislation, experts say, most are adopting a wait-and-see attitude. A recent survey of 484 companies, for example, found that 55% have not even begun planning for the ADA's effects, according to the New York-based law firm Jackson, Lewis, Schnitzler & Krupman.

Uncertainty is causing many businesses to wait until they are challenged before making any costly accommodations, says Richard Cupp, a law professor at Pepperdine University in Malibu, Calif.

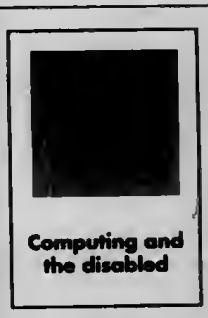
Under the law, persons who feel they have been discriminated against can file a complaint with the Equal Employment Opportunity Commission or file a civil lawsuit. Many firms will wait to see the outcome of those cases before taking action.

"Most of the really big companies who have not been proactive [on the ADA] will wait for the government to tell them what to do," says Judge Fowler, senior vice president and director of systems development at First Union National Bank in Charlotte, N.C., and active in disabled affairs.

Another problem that is working against ADA

*Continued on page 64*

Betts is *Computerworld*'s national correspondent based in Washington, D.C. Bozman is *Computerworld*'s West Coast senior editor.



**Computing and the disabled**

**KEY POINTS**

▶New legislation will require changes in everything from computer interfaces to voice mail to keep technology from creating barriers for the physically, emotionally and mentally impaired, but few firms are prepared.

▶The role of IS in equipping the new generation of disabled workers with computers is still evolving.

▶A specialized PC-based system gives counselor Marilyn Hoggatt a second chance at a career. See story page 65.

▶Fears about the cost of providing specialized computing equipment for employees with disabilities remain an obstacle. See story page 66.

▶Numerous organizations have been set up to provide information about providing computers for disabled people. See listing, page 67.

QUOTABLE:

*The ADA "has created a new wave of immigrants . . . who are going to have to be assimilated into our society like other waves of immigrants before us."*

*JAMES BARRY*
*NYNEX CORP.*

# How ready is your company?

CONTINUED FROM PAGE 63

compliance is that IS groups have heard little about the law and their possible role.

At Gold Kist, Inc., an Atlanta-based diversified agricultural business, for example, Mike Thrailkill, director of information services, says the firm's human resources department is probably studying the issue, but no initiatives have yet reached IS. Although Gold Kist currently employs disabled workers, Thrailkill says IS has not been asked to make any technological accommodations for them.

### High hopes

Advocates voice high hopes that the law and new technology will reduce unemployment and underemployment among disabled knowledge workers such as accountants, writers, lawyers and programmers.

"People I know think it's going to be like the Civil Rights Act," says G. Morgan Watkins, who directs microcomputer support at the University of Texas at Austin. Watkins, who has lost most of his sight to retinal degeneration, says an estimated 80% of the blind are chronically unemployed.

The impaired "have not been given the opportunities in large numbers to do what they want to do," acknowledges James Barry, an in-house consultant on disabled issues at Nynex Corp.

Disabled people and their supporters are counting on technology to play a major role in changing that reality. Computers can now be adapted and connected in ways that allow people to interact with others without any special attention or discrimination.

"The power of telecommunications is amazing," says David Clarke, a 21-year-old part-time programmer at Pacific Bell who was born with cerebral palsy. "You can be talking and communicating with other people, and they never have to know you're disabled. There's no inbred stereotype."

Barry, who is visually impaired, adds: "The computer is a nondiscriminatory device. It doesn't care whether you are black or white, male or female, able or disabled. It's going to respond to your command, whether that command is given by a mouth stick, an eye beam, a touch screen or the spoken voice."

Much of the hope for better integration of the disabled into the general work force rides on PCs, which can be equipped with hundreds of adaptive devices and specialized software.

Custom systems, for example, let blind workers use voice synthesizers to "read" electronic databases, professional journals, newspapers and other library materials. Deaf users can convert a program's sound "cues," such as beeps, into a visual symbol or flashing icon. Dyslexic users can use spell-checkers to produce top-quality letters.

Advocates say the cost of installing these adaptive technologies is fairly small — typically less than $5,000 for a PC and special software (see story page 66).

### IS role unclear

It is not yet clear what role IS will play in equipping the new generation of disabled workers with computers.

Traditionally, business units in large corporations have taken the lead role in acquiring adaptive technology, says Richard Wanderman, a Litchfield, Conn., consultant on the disabled who has advised many Fortune 1,000 firms. IS people have not tended to get directly involved, "unless they are asked to help with end-user training or have disabilities themselves," says Wanderman, who has dyslexia.

The response of one IS director at a national accounting firm, when asked about the ADA, is typical: "I'm not really sure what our involvement would be."

Probably the biggest reason for such detachment, experts say, is that until now, there have been relatively few users with disabilities in companies, and equipping them was simply not seen as an IS task. However, Nynex's Barry says, sheer numbers will change that.

Experts say knowledge of networking, equipment procurement, standards, integration, security and other areas now make computing professionals a natural choice for playing an important role in equipping people with disabilities.

"I think it's clearly within our ability in IS to make some jobs within the company more accessible to people with disabilities," First Union's Fowler says. "We have access to technology that would enable a broader base of employees . . . to be hired."

Fowler and others say IS has an excellent ground-floor opportunity to work closely with a corporate "champion" for the disabled — often a human resources manager or affirmative action officer — who in most cases will continue taking a lead role in supporting workers with impairments.

While many companies are adopting a wait-and-see attitude, some are continuing notable efforts to equip the disabled. IBM, Apple Computer, Inc., Boeing Computer Services, Electronic Data Systems Corp., Du Pont Co., Marriott Corp., McDonald's Corp., Nynex and Pacific Bell are among the companies frequently cited for their leading-edge efforts.

- At McDonald's, Tom Janus, a director of the firm's 300-person information services department, says he sees his role as a strong champion for the disabled.

"We've been very successful in hiring the disabled for data processing jobs," says Janus, who serves on the board of Programable, a Chicago-area recruitment and training group for disabled programmers. "Now we're trying to find people with professional skills who are disabled."

Several visually impaired programmers and one person who uses a wheelchair have been trained as Cobol programmers and hired for full-time jobs at McDonald's, he says. Their attendance records are exemplary, Janus adds, despite physical difficulties associated with commuting in the winter in Chicago.

Although there is no formal quota, Janus says, "My goal is to have 2% of our employees be persons with disabilities."

- Pacific Bell employs disabled people in its San Ramon, Calif., and San Francisco offices, including one group of blind or visually impaired telephone operators hired 10 years ago.

"We did it long before the ADA came along," says Bill Harpst, district manager of special operator services throughout California. When the jobs performed by partially sighted operators were automated in the mid-1980s, workers were given PCs, trackballs and speech software and taught how to touch-type. "Today, they answer the phones just as quickly as sighted operators," Harpst says.

- Syntex, Inc., a pharmaceuticals company in Palo Alto, Calif., created a program for disabled programmers, says Cathy Rogers, the firm's affirmative action officer. Hearing-impaired programmers are equipped with a telecommunications device for the deaf that allows them to receive company voice mail.
- First Union National Bank now employs a dozen people with various disabilities as programmers in its 700-person Automation Division, Fowler says.

Besides his efforts at the 1,100-branch bank, Fowler also works with several organizations for the disabled, including a state advocacy council and "Learning How," a national organization for disabled women. He is also board chairman of Opportunity Plus, a temporary employment agency for people with disabilities.

While exact plans have yet to be worked out, Fowler says the bank's information center will most likely notify internal customers about what technology is available to assist the disabled.

Looking ahead, experts say the process of hiring and equipping workers who have disabilities will slowly continue into the next century.

A consortium of major software and services vendors such as Microsoft Corp. is working with the General Services Administration, and the University of Wisconsin is researching adaptive software for the disabled.

Many say they also expect interest to grow rapidly as the decade progresses and the pool of skilled workers shrinks. The U.S. Census Bureau estimates that only about 28% of the nation's disabled hold full- or part-time jobs, so huge numbers of workers are available.

"ADA created a new wave of immigrants . . . who are going to have to be assimilated into our society like other waves of immigrants before us," Barry concludes.

"We're at a unique point in time in which the technology has come along, as has the legislation, to hire the disabled," says Alan Brightman, manager of the Worldwide Disability Solutions Group at Apple. "What the sharp companies are going to do now is to start looking for beautiful minds" in bodies with disabilities, he adds. ■

## Key dates

Provisions of the Americans with Disabilities Act of 1990 take effect on the following dates:

- Public accommodations: Jan. 26, 1992.
- State/local government activities: Jan. 26, 1992.
- Employers with 25 or more workers: July 26, 1992.
- Employers with 15 to 24 workers: July 26, 1994.

*Source: U.S. Department of Justice.*

## Work performance and the disabled

*A 1990 study of employees at Du Pont showed few differences between the performances of able-bodied workers and those with disabilities*

| | Workers with disabilities | Workers without disabilities |
|---|---|---|
| Safety | 97% | 97% |
| Attendance | 86% | 95% |
| Job duties | 90% | 95% |

Percent rated average or above. Based on a survey of 811 disabled employees (out of more than 3,000) rated by their managers against department peers.

Source: Du Pont Co. CW Chart: Michael Siggins

## Defining the word 'disability'

The Americans with Disabilities Act of 1990 defines the term "disability" as a physical or mental impairment that substantially limits one or more of the major life activities. Here's what that really means:

- **Major life activities:** Hearing, learning, performing manual tasks, seeing, speaking, walking, working, breathing and caring for oneself.
- **Physical impairment:** A physiological disorder or condition, disfigurement or anatomical loss.
- **Mental impairment:** Mental or emotional illness, mental retardation or specific learning disabilities.

The act also defines which kinds of illnesses are considered "disabilities" and which are not:

- **"Disability" includes** visual, speech and hearing impairments, acquired immune deficiency syndrome, alcoholism, cancer, cerebral palsy, diabetes, drug addiction, epilepsy, heart disease, multiple sclerosis, muscular dystrophy and tuberculosis.
- **"Disability" does not include** compulsive gambling, kleptomania, pyromania or sexual behavior disorders. Note: Advanced age, homosexuality, incarceration, left-handedness, obesity, poverty, pregnancy and common personality traits (such as poor judgment or a quick temper) are not impairments and thus are not disabilities.

*Source: U.S. Equal Employment Opportunity Commission and U.S. Department of Justice.*

# PC gives counselor second career chance

*With the aid of special software, Marilyn Hoggatt does everything from working at NSU to running her home*

BY KATIE CRANE

Thanks to a specially equipped personal computer, Marilyn Hoggatt has been able to grab a second chance for a career, even without the use of her hands. "The [wheel] chair is my legs, the computer is my hands," says the 40-year-old single mother, who became paralyzed from the neck down after a spinal injury in 1983.

The Oklahoma resident, whose spine was severed in a fall from a second-story porch, credits "assistive" computer technology with making it possible for her to begin her first job since her accident eight years ago. This past August, she began work as a part-time facilities services adviser at her alma mater, Northeastern State University (NSU) in Tahlequah, Okla.

The job marked the end of a long struggle. After her accident and rehabilitation, Hoggatt had gone back to school and completed her master's degree in counseling psychology in May 1984. She then had counseled clients in her home, but discouraged by the chronic pain, she had "dropped out and vegetated." In 1987, she regained her motivation and became active in disabled causes.

At home, Hoggatt uses a PC equipped with a specialized "sip-and-puff" device. By placing a tube in her mouth and inhaling and exhaling, she controls the wheelchair and various computer functions, such as checking her calendar.

Marilyn "is a goer," says Jim Marlow, a 59-year-old hearing- and reading-impaired student intern who works with Hoggatt. Her optimistic attitude has been an inspiration, adds Marlow, who holds an MBA degree.

Hoggatt's PC is equipped with a communication and environmental control system called Cintex made by Nanopac, Inc. in Tulsa, Okla. Soon, her IBM PC at the office will be outfitted with the same system. Hoggatt relies on the system to write letters, answer the phone and activate the printer.

She says the system is a huge improvement over the recent past, when it would take an entire day to write a two-page letter using older software. "The editing process was a nightmare," she recalls.

Now, she says, the $1,250 software, which includes artificial intelligence features, provides new options and independence. "It's my life," she says. "I'm dependent on it instead of people for so many things."

This reliance was evident a few years ago when Hoggatt's computer was stolen. "I couldn't do anything," she recalls. "It was like they had taken away my hands."

Fortunately, an unnamed benefactor donated a new system, and Hoggatt resumed work.

Steve Jennings

**NSU's Hoggatt:** *'The [wheel] chair is my legs, the computer is my hands'*

### Not so different

Aside from her use of special technologies, Hoggatt is like many professional women, struggling to balance job, two volunteer organizations, family, friends and church.

She founded and is now secretary of the Spinal Cord Injury Chapter of Oklahoma, for which she produces a quarterly newsletter. Hoggatt is also secretary of the board of directors at Legal Services of Eastern Oklahoma. She has a 20-year-old son, Kyle, living at home as well.

Besides helping at work, the PC and software system also help Hoggatt run her home. The system can control up to 256 household appliances and can "learn" more than 100 infrared commands, such as lowering the television volume or raising the heat.

Hoggatt landed her present job when she approached the NSU president and proposed a disabled student services program modeled after one at Oklahoma State University in Stillwater, Okla. The college president created a new position, charging Hoggatt with designing and implementing services for disabled people on campus.

Today, working with Marlow and a secretary, Hoggatt is in the first phase of the NSU project, which involves compiling an extensive report on the accessibility of the college's educational buildings and grounds.

She expects the job to become full time when the college opens a student support center with tutors, readers, typists, note takers, books on tape, braille machines, large-type computer screens and interpreters for the deaf.

Despite her successes, Hoggatt doesn't downplay the daily challenges she faces. She has fallen from her wheelchair repeatedly and now must be accompanied everywhere. Routine tasks such as going to bed and rising require help. And there is the chronic pain.

Marlow adds that frustrating difficulties can arise. When Hoggatt dictates, for example, Marlow says he sometimes has problems transcribing because of his own disabilities.

Even though problems are possible, Hoggatt says, employers should not "let their red flag come up" when a disabled person requires minor technological accommodation. The productivity and attendance of disabled workers often matches that of able-bodied peers, she says (see chart page 63).

Hoggatt says she dreams about the day when a laptop outfitted with Cintex will let her be as independent on the road as she is at home and in the office. She also hopes to switch someday from sip-and-puff to voice commands.

Occasionally, she "cheats" and types on a full keyboard by placing a dowel rod in her mouth. She says this approach lets her type more quickly.

Overall, Hoggatt says she sees herself as an example of what can be accomplished with the right attitude and technology.

"Can you imagine anyone more disabled than someone paralyzed from the neck down?" she asks. "I can. I know plenty of people who are paralyzed from the neck up." ●

Crane is a free-lance writer in Norwich, Vt.

## When trying to get jobs, disabled workers advised to BYOPC (bring your own PC)

The specialized technology that lands on the desks of newly hired workers with disabilities usually isn't placed there by the information systems department.

People with disabilities are often counseled to bring their own equipment to remove at least one concern of prospective employers.

"Sometimes, the employer doesn't want to put out money up front to make the computer accessible for a blind person," explains Donna Seliger, president of the Visually Impaired Information Specialists group at the American Council of the Blind. Seliger, who works at a Sears, Roebuck and Co. store in Des Moines, Iowa, is not alone in that belief.

"We're telling disabled people, 'Don't be denied a job because a computer system can't be set up,' " says Ellen Daly, a legislative analyst with the Presidents Committee on Employment of People with Disabilities in Washington, D.C.

During the 1980s, many disabled people obtained adapted PCs for university or home use, she explains. Today, some employers will accept a worker-owned PC with adaptive equipment that is brought onto the job site, Daly says.

Special computers can arrive at firms in other ways, too. State agencies, for example, sometimes provide grants for the purchase of adaptive equipment, says Tom Janus, an information services director at McDonald's Corp. in Oak Brook, Ill. "If the state thinks that the disabled person is going to become self-supporting, they might help to provide the equipment," he says.

Also, donations from computer makers themselves can bring special equipment into a company. Some of the special PCs used by McDonalds' headquarters employees, for instance, were donated by IBM through Programable, an IBM-sponsored training course for disabled programmers.

It's not clear right now what role the IS department could or should play in the acquisition, maintenance and integration with other systems of specialized technologies for the disabled. But some experts suggest that IS departments need to become more involved than they historically have been.

JEAN S. BOZMAN

# Dispelling cost myths about technologies for the disabled

BY CATHERINE MARENGHI

Powerful new technologies are helping to lower many of the barriers blocking disabled people from the workplace. But advocates for the disabled say one big hurdle remains: price.

All the technology in the world won't do any good if firms believe it's too expensive, experts say. Even in cases where technology is reasonably priced, the *perception* of high cost can combine with other kinds of prejudice to block hiring.

"There are persistent myths about hiring the disabled. Companies fear that hiring the disabled will cost them tens of thousands of dollars in special technology," says Andrew Forman, vice president and co-founder of Lane & Laurence, Inc., a Boston-based personnel firm that specializes in placing disabled workers.

In many cases, Forman says, these fears are unfounded. Although the system he uses to overcome his own visual impairment — a Telesensory Systems, Inc. Vantage video magnifier and Vista screen-enlargement software — costs "a few thousand dollars," Forman was able to obtain it on loan from the Massachusetts Commission for the Blind.

Furthermore, he says, the required accommodation can often be something "as simple as using cinder blocks to elevate a desk, so the visually impaired can read material at close range."

Marenghi is a Boston-based free-lance writer.

### For tight budgets

There are many adaptive aids more sophisticated than cinder blocks available at low cost. For example, less than $100 buys a specialized keyboard or input pen for a disabled person. For $149, companies can get text-to-speech software for IBM Personal Computers and compatibles. For less than $400, buyers can have Intouch software from Berkeley Systems, Inc. in Berkeley, Calif., which creates a touch screen for Apple Computer, Inc. Macintoshes, for example.

Advocates also cite several studies — including those by the U.S. Department of Labor, the U.S. General Accounting Office, the president's committee on the disabled and several private firms — which conclude that 80% of all accommodations for people with disabilities cost companies less than $500 each.

Even products that are considerably more expensive than $500 are cheaper than they used to be. James Barry, an in-house consultant on disabled issues at Nynex Corp., points out that "expensive" is relative, and prices for many technologies have fallen sharply over the last decade.

Barry, who became visually disabled more than 10 years ago, relies on a "reading" device from Kurzweil Applied Intelligence, Inc. in Waltham, Mass., to keep up with his electronic mail. "I first saw a Kurzweil Reader at the New York Public Library in 1980, and it was $40,000. Now, equipment like that costs $4,000."

Nevertheless, other workers with disabilities say that while assistive systems can provide invaluable aid, the cost remains an obstacle for many companies.

Kelly Ford, a project manager at the Trace Research and Development Center in Madison, Wis., says the latest technology tends to be expensive because development and marketing costs are high and sales volumes are low.

The center, which does "rehabilitation engineering" for the disabled, focuses on access, environmental control and augmented communications. As part of its information resources, the center maintains a database of more than 18,000 assistive technology products (see resources, page 67).

Ford, who is blind, uses a voice output package called Outspoken from Berkeley Systems to "read" his E-mail and do "a fair amount of writing" on his Macintosh. In addition to reading text, the Outspoken software also transforms the Macintosh's graphical user interfaces and icons into an audible interface.

### Cost still an issue

Lex Frieden, a vice president at The Institute for Rehabilitation and Research in Houston, says he believes that while great strides have been made in development, pricing is still a major issue.

Frieden, who has been partially paralyzed since a car accident in 1967, uses IBM's Voicetype — a multimedia speech-recognition product unveiled in May — to do word processing and spreadsheet calculations by dictation. Although he says he appreciates the technological progress that has been made, Frieden adds that the system's cost would be daunting for many, if not most, employers. The software alone costs $3,185 and requires an Intel 80386SX-based PC with at least 6M bytes of random-access memory.

To help ease the costs to businesses,

# Assistive, adaptive computer tools

*Literally thousands of computer products designed to enable disabled workers have appeared during the past few years. What follows is a sample.*

FOR MOTOR IMPAIRMENTS:

**Voicetype**, *a $3,185 package, allows mobility-impaired users to perform computer tasks by speaking instead of typing. It has a 7,000-word active vocabulary and requires an IBM Personal System/2 with at least a 386SX processor.*
IBM Special Needs Information and Referral Center
4111 Northside Pkwy.
Atlanta, Ga. 30327
(800) 426-2133

**Cinton**, *a PC software system, is a communications aid, word processor and environmental control system. Price is $1,250 for the software.*
Nanopac, Inc.
4833 South Sheridan Road, Suite 402
Tulsa, Okla. 74145
(918) 665-0329

*A tongue-operated device for the Apple Computer, Inc. Macintosh, the* **Tonguetouch Keypad**, *and the* **Zofcom Control System** *are packaged together for $5,975. The keypad fits into the roof of the user's mouth and weighs less than 1 ounce.*
Zofcom, Inc.
3962 Nelson Court
Palo Alto, Calif. 94306
(415) 858-2003

*For Apple computer users,* **Screendoors** *is a predictive point-and-click graphical keyboard that appears on the computer screen and sells for $350.* **Telepathic** *is a predictive word accelerator that sells for $195.*
Madenta Communications, Inc.
216 Advanced Technology Centre
9650 20th Ave.
Edmonton, Alberta T6N 1G1
(403) 450-8926

FOR VISUAL IMPAIRMENTS:

**Outspoken** *is a $395 software package that allows the legally blind to use Apple Macintoshes by converting the "visual" interface into an "audible" interface.* **Intouch**, *a $395 utility for the blind, displays any information on the Macintosh screen on a tactile device, and* **Inlarge**, *a $95 software package for the Macintosh, gives the partially sighted access to mainstream software.*
Berkeley Systems, Inc.
1700 Shattuck Ave.
Berkeley, Calif. 94709
(415) 540-5535

**Multivoice**, *a lightweight, portable, battery-powered speech-synthesis device for nonspeaking users, was developed by Children's Hospital of Boston in conjunction with Digital Equipment Corp. The tool sells for $1,600.*
Children's Hospital of Boston
Institute on Applied Technology
300 Longwood Ave.
Boston, Mass. 02115
(617) 735-8391

**Dectalk PC**, *a speech-synthesis tool for the blind, works with screen access software. Dectalk, a board that plugs into the PC, gives the user verbal position indications of where the cursor is on the screen and reads the text aloud. It comes with braille labels. It costs $1,195.*
Digital Equipment Corp.
Assistive Technology Group
30 Forbes Road
Northboro, Mass. 01532
(800) 344-4825

**Dragon Dictate-30K** *is a voice-recognition system that runs on IBM PCs and compatibles and incorporates a 30,000-word vocabulary for $8,995.*
Dragon Systems, Inc.
320 Nevada St.
Newton, Mass. 02160
(617) 965-5200

**Telesensory's Voyager** *video magnifier enlarges printed materials up to 60 times for the visually impaired*

*For printing needs, the $2,995* **Romeo Braille Printer** *and the $19,500* **Braille Express** *are available for PCs.*
Enabling Technologies Co.
3102 S.E. Jay St.
Stuart, Fla. 34997
(407) 283-4817

**Monologue** *is a text-to-speech software package that works with IBM PCs and compatibles and sells for $149.95.*
First Byte
3100 S. Harbor Blvd., Suite 150
Santa Ana, Calif. 92704
(714) 432-1740

**Screenreader**, *which enables those with visual impairments to transform information on the computer screen into voice output, sells for $648 for the IBM PS/2 version and $721 for the PC version.*
IBM Special Needs Information and Referral Center
4111 Northside Pkwy.
Atlanta, Ga. 30327
(800) 426-2133

**Braillemate**, *a portable handheld product for visually impaired people, works with the IBM PC. It costs $1,595.*
Telesensory Systems, Inc.
455 North Bernardo Ave.
Mountain View, Calif. 94043
(415) 960-0920

FOR SPEECH DISABILITIES/ HEARING IMPAIRMENTS:

*Blissymbolics is a system for physically disabled people who lack functional speech.* **Accessbliss**, *an Apple Hypercard program, gives quick access to the complete set of currently available Blissymbols and sells for $250.*
Blissymbolics Communication International
250 Ferrand Drive, Suite 200
Don Mills, Ontario M3C 3P2
(416) 421-8377

**Speechviewer**, *priced at $1,235, is a vocalization product that helps speech- and hearing-impaired individuals learn to communicate more effectively.* **Phonocommunicator**, *for $600, is a computer support system to allow hearing- or speech-impaired people to better communicate by phone.*
IBM Special Needs Information and Referral Center
4111 Northside Pkwy.
Atlanta, Ga. 30327
(800) 426-2133

the U.S. government is offering tax incentives to companies that are willing to make physical and technological accommodations. For instance, the Internal Revenue Service allows an "Architectural and Transportation Barrier Removal Deduction" of up to $15,000.

Another incentive, the Targeted Jobs Tax Credit, offers employers a credit against their tax liability if they hire individuals from nine targeted groups, including the disabled. The credit is equal to 40% of first-year wages, with a maximum credit of $2,444 per employee for the first year of employment.

Also offered is the Disabled Access Credit, which addresses credits for "reasonable expenses" for technologies and accommodations to help disabled workers in the workplace.

Still, observers say that if adaptive technology is to gain widespread acceptance by employers and individuals with disabilities, it must come in a cheaper incarnation, preferably in palmtop form.

One glimpse of tomorrow's technology came in June, when a $1,595 braille-based portable PC was unveiled by Telesensory in Mountain View, Calif. The 1-pound computer includes a speech synthesizer, an electronic braille cell, a braille keyboard and 100K bytes of internal memory, according to the manufacturer.

Research and development of this kind can benefit the entire computing community, not just the disabled, Frieden says. "It's like Velcro. One of the first commercial uses was for people who couldn't tie their own shoestrings. Now, Velcro closures are used on shoes for everybody."

He says he believes that technologies such as speech recognition will eventually be adapted for use by everyone.

**Technological barriers**

While monetary concerns dominate, technological problems also loom. Perhaps the largest barrier for the blind is the trend toward bit-mapped graphical user interfaces, which cannot be read by screen-reading devices that rely on character-based programs.

However, research is under way to produce systems that allow blind individuals to navigate the screen and read graphics, says Jim Geletka, executive director of the Information Technology Foundation in Arlington, Va.

Geletka says the foundation is encouraging software vendors to provide hooks into their standard packages so that third-party developers can provide add-on products for disabled workers. Eventually, however, experts hope the accommodating features will be incorporated into mainstream products.

Computer users, disabled or not, should have the option to have large-type displays, voice output and nonkeyboard interfaces, says Charles Merbitz, coordinator of the rehabilitation laboratory at the Illinois Institute of Technology in Chicago.

Experts agree that, just as parents with strollers find the sidewalk "curb cuts" designed for wheelchair users beneficial, the "electronic curb cuts" required by the ADA will improve computer products for a wide range of users.

*Computerworld National Correspondent Mitch Betts contributed to this report.*

## Types of assistive technologies

"Assistive technologies" for disabled people fall into several broad categories:

- **Magnification:** Software packages that deliver large-type screen displays, as well as closed-circuit television monitors to magnify printed matter and display it on a video screen.
- **Voice output:** Software and hardware devices that can read aloud text and machine commands displayed on a screen.
- **Alternative input devices:** Keyboard and mouse alternatives, ranging from speech recognition, large-key keyboards, pointing devices and switches that can accept winks, eyebrow movements, sip-and-puff, tongue or virtually any other physical movement as input.
- **Augmented communication:** Technology that translates audio data such as doorbells, ringing telephones and actual phone conversations into video displays for the hearing- and speech-impaired, as well as tools to provide audio signals for screen prompts, icons, capitalization and so on for the visually impaired.
- **Word processing aids:** These software tools take several different forms. An artificial intelligence tool, for example, can "learn" a user's vocabulary and anticipate letters and words before they are input. Other shrink-wrapped programs anticipate the next word needed to complete a sentence.
- **Environmental control:** Tools to help the handicapped master their environments via personal computers, including activating appliances, changing TV channels, turning off lights and answering doorbells.

# Information resources (groups, pubs, product info centers)

GROUPS AND ASSOCIATIONS:

**Association for Computing Machinery**
Special Interest Group on Computers and the Physically Handicapped
Chairman: Ephraim Glinert
11 West 42nd St.
New York, N.Y. 10036
(212) 869-7440
*Promotes professional interests of computing personnel with physical disabilities.*

**Electronic Industries Association**
Assistive Devices Division
2001 Pennsylvania Ave., N.W.
Washington, D.C. 20006
(202) 457-8700
*Publishes 28-page booklet called* Extend Their Reach *as a basic introduction to assistive technology for people who are newly disabled or unfamiliar with technologies to aid them.*

**Job Accommodation Network**
West Virginia University
809 Allen Hall
Morgantown, W. Va. 26506
(800) 526-7234 (U.S.)
(800) 526-2262 (Canada)
*Information on ways to accommodate people with disabilities in the workplace.*

**Trace Research and Development Center**
University of Wisconsin
1500 Highland Ave.
Madison, Wis. 53705
(608) 263-2237
*Maintains a database of more than 18,000 assistive technology products.*

**General Services Administration**
Clearinghouse for Computer Accommodations
18th and F Streets, N.W.
Washington, D.C. 20405
(202) 501-4906
*Resource for government employees and managers seeking information on how to accommodate disabled people.*

**National Cristina Foundation**
42 Hillcrest Drive
Pelham Manor, N.Y. 10803
(914) 738-7494
*Provides computers and technology to people with special needs.*

**CD-ROM Users Group**
Special Interest Group to Expedite the Accommodation Law
c/o Co-chairman Tom Dennison
5817 South 4th St.
Arlington, Va. 22204
(703) 379-2842
*Subcommittee of the User Group's special interest group on CD-ROM Applications and Technology.*

**The President's Committee on Employment of People with Disabilities**
1331 F St., N.W.
Washington, D.C. 20003-1107
(202) 376-6200 (voice)
*Committee mandated by President Truman in 1947 with goal of educating U.S. employers that people with disabilities are viable workers. Has broad range of information on employment of disabled.*

**Resna**
1101 Connecticut Ave., N.W.
Washington, D.C 20036
(202) 857-1199
*Interdisciplinary association for advancement of rehabilitation and assistive technologies.*

PUBLICATIONS:

**National Braille Press, Inc.**
88 St. Stephen St.
Boston, MA 02115
(617) 266-6160
*Offers books and guides on personal computers for blind and visually impaired people.*

**"Raised Dot Computing"**
408 S. Baldwin
Madison, Wis. 53703
(608) 257-9595

**"Equal to the Task II: 1990 Du Pont Survey of Employment of People with Disabilities"**
Du Pont Co.
Attention: G51932
P.O. Box 80029
Wilmington, Del. 19880
(800) 527-2601

***Augmentative Communication News***
One Surf Way
Monterey, Calif. 93940
(408) 649-3050

VENDOR ASSISTANCE:

**Apple Computer, Inc.**
Office of Special Education & Rehabilitation
20525 Mariani Ave.
Cupertino, Calif. 95014
(408) 996-1010
*Promotes increased awareness of computer tools available to the disabled and provides access to information on how to implement computer solutions at home, in the workplace and at school.*

**Apple Computer, Inc.**
Worldwide Disability Solutions Group
20525 Mariani Ave.
Cupertino, Calif. 95014
(800) 732-3131, ext. 950
*Maintains an extensive listing of products that work with the Macintosh computer for people with disabilities.*

**Digital Equipment Corp.**
Accessibility Resource Center
8100 Corporate Drive
Landover, Md. 20785
(301) 306-6210
*Handles information on making computers accessible to disabled people. Works with other vendors to make products more accessible to the disabled.*

**Digital Equipment Corp.**
Assistive Technology Access Center
30 Forbes Road
Northboro, Mass. 01532
(508) 351-4570
*Displays various types of technologies to enable users with all types of physical impairments.*

**IBM**
Special Needs Information and Referral Center
4111 Northside Pkwy.
Atlanta, Ga. 30327
(800) 426-2133
*Provides information to consumers and corporations seeking information on both IBM and non-IBM products for disabled people.*

**NEC Corp.**
NEC Foundation of America
8 Old Sod Farm Road
Melville, N.Y. 11747
(516) 753-7021
*NEC recently placed a $10 million endowment to create the foundation, which concentrates on supporting science and engineering education and using technology to help disabled people.*

# Of the 106 printers *PC Magazine* tested, only one was able to produce this document.

PC MAGAZINE EDITORS' CHOICE
November 26, 1991
IBM LaserPrinter 10

It'll be at least twelve months before another printer can show you this kind of output.

Because only the new IBM LaserPrinter 10 met the demanding criteria for "advancing the industry's lo." and "redefining the state of the art" it took to earn this year's *PC Magazine* Award for Technical Excellence for printers.

*PC Magazine* also singled out the LaserPrinter 10 for an Editors' Choice award, citing "the fastest PostScript® graphics we've ever seen from a desktop laser printer," praising its optional "true 600-dpi output—no marketing doublespeak or technical gimmickry," and describing it as "bristling with paper-handling options."

High praise indeed, especially for a company that's less than a year old: Lexmark International, created from a business unit of IBM to develop, manufacture and distribute IBM personal printers, typewriters, keyboards and related supplies.

For your nearest dealer, call 1 800 IBM-2468, ext. 804 (in Canada, 1 800 465-1234), and see the award-winning IBM LaserPrinter 10. One printer that's at least a year ahead of the pack.

LEXMARK™

*Developer, manufacturer and distributor of IBM LaserPrinters.*

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THE NEW IBM LASERPRINTERS. PAGES AHEAD.

# Cash drain, no gain

***U.S. companies have spent billions on powerful technology to do things faster and better. Why, then, have productivity gains been so puny?***

BY GARY LOVEMAN

Despite years of impressive technological improvements and investment, there is not yet any evidence that information technology is improving productivity or other measures of business performance on a large scale — or, more importantly, significantly enhancing U.S. economic performance. The troubling fact is that productivity growth in the U.S. has slowed sharply, dropping from an average of 2.4% in the 1950s to 1.3% in the 1980s, just at the time when information technology has become pervasive.

How can that be? The price of computing power has dropped dramatically in the last few years, even as the price of other capital goods has steadily risen (see chart below). Simple economics suggests that firms' ability to acquire computing power at vastly reduced cost should lead to increased use of information technology, tremendous efficiency gains and substantially lower production costs.

Firms have in fact reacted to these price declines by buying more computing power, to the extent that information technology spending now makes up essentially half of all durable equipment spending, according to government figures.

However, economic good news has not followed hefty information technology investment. The problem, in the words of Nobel laureate and economist Robert M. Solow, is that "you see computers everywhere but in the productivity statistics."

The fundamental blame rests with organizations. Information technology holds great potential, but companies have failed to provide structures and processes that facilitate the use of information technology in ways that create significant net value.

The inability to value information technology "products" or to assess their associated costs has consistently led to poor investment decisions, unproductive use of people's time and, in some cases, activities that actually erode rather than create value.

Information systems managers must recognize the current, unsatisfactory performance of information technology and its causes and play a central role in the organizational reforms necessary to improve technology's contribution to business results.

Yuki Kanda

Loveman is an assistant professor of economics at Harvard University Graduate School of Business Administration.

## Economic indicator

Productivity growth is a number that indicates the extent to which a company or a country can create more or better products and services with fewer inputs, such as equipment, materials and labor. Productivity growth is the mechanism by which profits and wages can grow over time, and it is the central means by which companies and countries remain competitive. Consequently, it is a very important indicator of economic performance; it is far more than a way to measure the replacement of people by machines.

### Small firms overlooked?

Naysayers to this productivity argument claim that economists' aggregate statistics obscure good performance at individual firms.

In studies I conducted from a 1978-1984 sample of large U.S. and Western European manufacturing businesses, however, there was no evidence of any positive relationship between information technology investment and business performance. The results did suggest that there may typically be a delay of a year or two in achieving improvements from information technology, but the improvements were quite small and insufficient to offset the costs of the early years.

While there is no doubt that individual companies have used information technology very successfully, productivity gains from information technology overall have been disappointingly small. For a country that competes in the global marketplace, our productivity rates are a disaster.

A continued failure to exploit the opportunities presented by information technology may very well result in U.S. firms being viable only as low wage/low productivity producers in international markets.

The questions, then, remain: Why are the returns on information technology investment so meager, and what can the IS manager do to increase them?

### Immeasurable benefits

The main cause for these low productivity gains is that we can't meaningfully measure the value created by information technology. Information technology produces outputs that are not only intangible but also, typically, quite malleable.

Many firms have, for example, invested in large systems to provide more comprehensive and more timely pension and benefit information to employees. This information is not a product that has a well-defined market value; its value can be determined only by those involved in its creation and use.

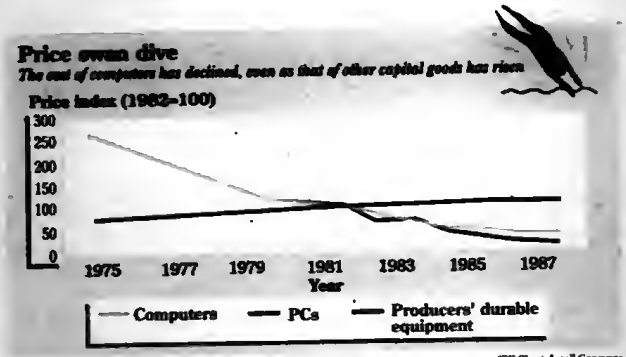
To complicate matters, even if the value of the initial system is clear, organizations do not yet have mechanisms for measuring the value of enhancements that add more information or improve timeliness. Of course, the process of improving the system is costly in terms of labor as well as information technology resources, but it is very difficult to know when the costs are exceeding the gains.

*Continued on page 70*

*Continued from page 69*

The problem is manifest not only in terms of the use of existing information technology resources but also in terms of decisions to acquire more information technology resources.

In the U.S. Army, for example, logisticians are responsible for making sure the right number of tank crews arrive on the battlefield with the tanks when a hostility occurs at a given location. The Army staff may try to improve the odds of a proper match by investing in a large information technology system. However, it can't accurately gauge how much it is worth to them to improve the odds by a given amount.




**Price swan dive**
*The cost of computers has declined, even as that of other capital goods has risen*

Source: U.S. Department of Commerce and Ernst R. Berndt

CW Chart: Janell Genovese

### Internalizing resources

A large percentage of information technology resources is used by firms for internal purposes (as opposed to activities that directly affect the customer), which requires that decision-makers be able to decide the value of enhanced internal information. In most cases, they know the work was done previously with less information (e.g., decisions at staff meetings were made with less elaborate analysis).

However, companies just don't have a way to decide how much information is enough. Because there is a strong, implicit assumption in many organizations that more information and more analysis is always better, it is quite possible that the introduction of cheap computing in an organization can lead to a huge overinvestment in costly information generation and processing that, at the end of the day, has scarcely any impact on business results.

Review mechanisms would help decide how much is enough, but there is often no review mechanism, even for areas that have traditionally been associated with great productivity gains — maintenance and enhancement of existing large systems or applications. Companies devote a large share of information technology spending to get the productivity gains associated with replacing these systems or applications. However, they have no way to ensure that existing operations are periodically reviewed and compared against alternatives.

The lack of a review mechanism is closely related to the fact that performance measures that would allow managers to identify gross inefficiencies are rarely collected routinely in the information technology world. In contrast, companies systematically monitor more traditional capital equipment, such as machines in an assembly operation, so that managers can take action quickly to improve performance.

This inability to measure value meaningfully adds up to what economists refer to as an internal market failure. Information technology resources are not properly allocated because managers are not able to measure costs and benefits properly and make decisions accordingly. Misallocated resources lead to ineffective performance and little, if any, productivity improvements.

> FOR A COUNTRY that competes in the global marketplace, our productivity rates are a disaster.

### Backward methods

Nowhere is this failure more evident at many firms than in the information technology budgeting process.

I have seen many cases in which the corporate information technology budget is determined first by asking managers throughout the organization to list the technology resources they will need for the upcoming budgetary period. These various requests are simply compiled in divisional and then corporate totals, perhaps with some review by the IS manager.

When the budget deliberations are held, the total request is multiplied by a number between zero and one, and the results are transmitted back down the line to lower level managers.

If information technology is truly a strategic asset in the sense that it can be harnessed to shape and support the organization's business strategy, then it is absolutely clear that this type of budgetary process cannot possibly lead to the strategic use of information technology and improvements in productivity and economic performance.

Effective use of information technology would require that senior managers decide first what role technology — and information, more generally — is going to play in the organization and then make decisions about how information technology can best be integrated with the strategy and organization of the enterprise.

One company making strategic use of technology is Batterymarch Financial Management, a Boston-based pension and investment firm. The fund managers develop investment strategies and use computers first to scan the financial markets for investment opportunities that meet preset business criteria and then to automatically execute the purchase and sale of the securities. The company's investment strategy is effectively and efficiently implemented using information technology.

The commonality and integrative characteristics of information technology must be carefully considered so that lower level managers have some way of coherently using information technology to pursue well-defined organizational goals. That indicates the need for some central oversight of information technology planning, but the recent trend toward organizational decentralization has complicated this process.

Executives are reluctant to be viewed as centralizing decisions when they are otherwise encouraging the de-evolution of authority.

### Industry competition at fault

Another key cause of poor productivity performance is that information technology is often used strategically to acquire and manipulate information so that a particular firm can take sales away from its competitors.

Technology may, for example, be used to analyze the characteristics of the individuals who buy a particular product and the results used to market the product better. No more products are sold and no more sales are recorded on an industry basis, and hence the industry is no more productive, but it is in the interests of each firm to participate in the competition so long as the market stays competitive.

Airlines, for example, devote a lot of computer power to frequent-flier programs, which are intended to build brand loyalty and distinguish one carrier from another. It would be risky for a major carrier not to offer such a program. But at the industry level, frequent-flier programs increase costs without adding much to total revenue.

There is nothing wrong with using information technology this way, as long as the market is profitable after the costs of remaining competitive are tallied. The problem is that in many industries, information technology is merely shifting a given level of sales among competitors, which does not lead to improved economic performance overall.

### The critics speak out

Critics of the claim that information technology has failed to deliver substantial productivity gains often argue that economists fail to count many of its important benefits.

For example, there is certainly value in having access to one's bank account 24 hours a day in most major cities around the country via automated teller machines. It is difficult to quantify this value, however, because it does not show up clearly in measures of either banking activity or banking prices. Output of this sort does not generally make it into the productivity calculations, and hence the

*Continued on page 72*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*Continued from page 70*

productivity gains from information technology in such cases are underestimated.

However, given the enormous missing punch from information technology, it is unlikely that unmeasured services can account for more than a small amount of the gap.

In fact, Martin Baily and Robert Gordon, professors of economics at the University of Maryland and Northwestern University, respectively, have estimated that only 0.1% per year in additional productivity growth can be attributed to the failure to properly account for the intangible business services from information technology.

**Exciting opportunities**

While the news so far has not been good, information technology still presents incredible opportunities for IS managers to greatly enhance the performance of their organizations. The capacity of the technology to deliver significant returns is there and has been widely documented for many companies and applications.

Examples range from large productivity gains in check processing and electronic fund transfers in the banking sector to significant performance improvements in the credit-card business, in which customer representatives are provided with the information and authority necessary to handle most customer requests.

In all of these cases, information technology has been used to reconfigure work in a way that increases efficiency and adds value to the consumer. What are needed are improved managerial and organizational competencies to realize these potential gains on a wider scale.

The path toward improvement has two key, interrelated components. First, the IS manager must be involved in the processes by which strategies are formulated and organizational systems and processes are established to pursue them. The IS manager must be an advocate for clearly defining the role that information and information technology will play in the organization.

If the IS manager is not currently involved in the strategy formulation process, this is an important red flag that may indicate that IS is viewed as a passive support function rather than a key part of the business. As such, information technology is unlikely to provide fundamental improvements in the way information is used in the organization and is accordingly less likely to yield large productivity gains.

The information technology budget process must reflect a well-thought-out view of technology's role in the organization's business strategy and internal activities to support the strategy. Companies must have a clear view of how information technology fits the business and should spend according to that view.

Secondly, the IS manager must assume leadership in establishing processes for valuing information technology outputs. This involves helping operational managers understand the roles that various kinds of computing play in their organizations and helping them begin to develop a set of norms about how and how much computing should be used in routine operations.

This kind of role clearly requires IS managers and their staffs to be involved and conversant in the work of operational managers and to be able to anticipate problems and take an active role in guiding the use of information technology. Such an IS manager is not simply a support person who responds to requests but someone who is able to see operational problems in the broader context that shapes their effective, long-term resolution.

These are very broad and challenging prescriptions to a very broad and challenging problem. Effective solutions will surely involve practical efforts such as training, better application programming and badly needed improvements in accounting standards and data collection methods. The point of this argument, however, is that these important practical efforts are subsidiary to a profound reconsideration of the role that information plays in the organization and the establishment of systems and processes that make it easy for managers to use information technology effectively. ●

# Keep an eye on services firms

## *They indicate U.S. technology's performance*

Stephen Roach, a senior economist and principal at Morgan Stanley & Co. in New York, has looked extensively at the use of information technology in the services sector.

Because roughly four-fifths of the total information technology capital stock is in the services sector, the experiences of services companies are crucial to the overall performance of information technology in this country.

Roach found that the explosion of computing power in the services sector has done little for white-collar productivity (see chart below).

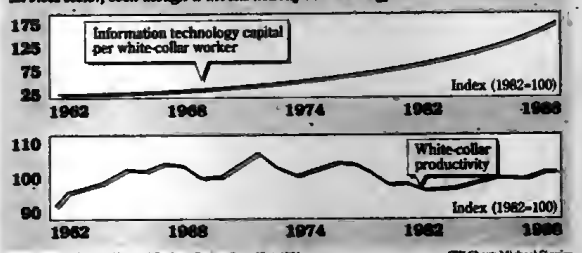
Economists studying the area say that without a way to gauge the effects of technology acquisitions before any money is spent, companies have no way of knowing what their expenditures will mean to white-collar productivity.

Case studies of insurance companies, for example, have shown that the initial productivity gain from replacing clerks with mainframe computers — used to justify the computer acquisitions — was later offset by the hiring of new managers to analyze data generated by the computers. In the end, the net productivity gain was small.

GARY LOVEMAN

**Big deposit, no return**

*There is no sign of overall productivity improvements in the services sector, even though it invests heavily in technology*




Source: Stephen Roach, *Harvard Business Review*, Sept./Oct. 1991

CW Chart: Michael Siggins

# Making sense of the 'productivity paradox'

It's called the "productivity paradox." It's described as a phenomenon in which U.S. productivity growth has slowed while information technology has made great power and performance strides. According to economist Gary Loveman, this poor productivity showing has the potential to hurt U.S. industry economically and globally.

*Computerworld* asked some well-known IS figures for their opinions about what's going on.

**DuWayne Peterson**

**President DuWayne Peterson Associates Pasadena, Calif. (Former chief information officer, Merrill Lynch & Co.)**

I think the problem is that we've done a poor job of changing the way work is done with technology. We've just taken automation and computer technology and loaded them in on top of an existing organization without making sure they're understood and used and exploited properly.

I've told people that some of what we've done wrong is that we got rid of methods engineers in organizations. These were the people who would study work flow before you'd bring computers in. I have to say I was one of the operations research guys who came in 30 years ago and looked down my nose at those people as being a bunch of low-level time-study analysts.

Yet they were the ones making the fundamental changes that we don't have right now. With methods engineers, you would never go in and touch an organization unless you thought through what improvements needed to be done manually and how you needed to change work flow before you introduced data processing and information technology.

I think what might help us with our poor productivity is that we're now going back to that way of doing things with process re-engineering.

Having said that, I think one thing that tends to be forgotten by economists with their macro input and output analyses is that information technology makes possible things we couldn't do before. That's not to say what they say is a whitewash and that companies' use of technology has been marvelous. But there have been some major breakthroughs in transaction processing and the number of things that can physically be done that we couldn't do before. I think that's been ignored.

**Peter Daboul**

**Senior vice president of information system services Mass Mutual Life Insurance Co. Springfield, Mass.**

There has been a buying binge in the last five to seven years in areas such as workstations, LANs and PCs without an equivalent productivity payback.

The evolution of hardware, software and other products occurs much more rapidly than the ability of the average organization to assimilate those and make any good use of them. There's a tremendous lag time. By the time an organization figures out the technology and begins to properly apply it, there's probably two or three more releases that have come out.

And I'm not just talking about the PC area; there's an unending laundry list. You've got AI, imaging, CASE, object-oriented programming, frame relay and so on.

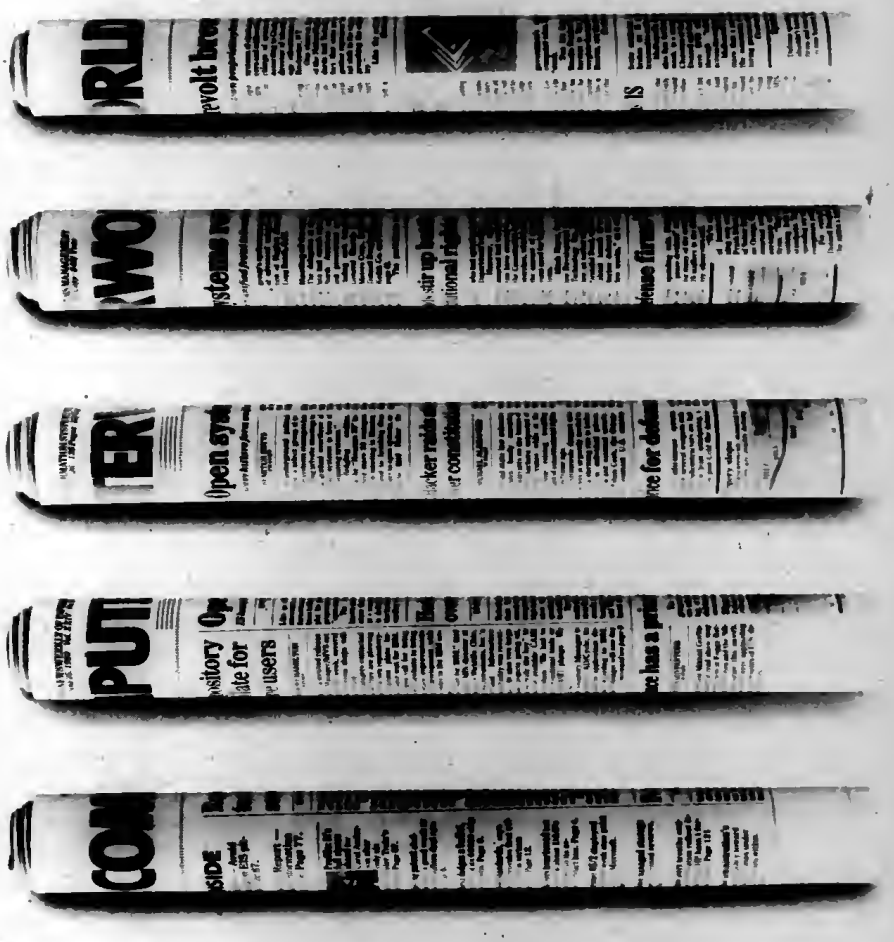
What companies have to do is to be very judicious in their use of new technology and remain very focused on what they do select. To take advantage of productivity, you need a clear set of requirements and solid cost-benefit analysis for new and different products.

**Henry Pfendt**

**Director, information management Eastman Kodak Co. Rochester, N.Y.**

I think our focus has been all wrong. We've got to turn from concentrating on making the individual more productive to making the enterprise more productive.

I'm not so sure a productive enterprise is one in which every single person in the enterprise is a computer expert. I think you'd be suboptimizing the whole by trying to fully optimize the parts. Corporate America has a systemic problem, and it has to be solved on a systemic basis. We need to focus on the mission of the enterprise as a whole and on making that more efficient.



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COMMENTARY

*Don Tennant*

# Microsoft not so stuck-up after all

***IBM is a valued customer, and Microsoft should do whatever it can to make IBM happy. Digital Research's technical expertise is to be respected. After all, if it weren't for Digital Research, Microsoft would not have a decent DOS.***

The text of propaganda leaflets being dropped over Redmond, Wash.? Nope. That's a corporate vice president of Microsoft talking.

For whatever reason — contagious peace vibes emanating from Madrid or some new marketing tack aimed at promoting a kinder, gentler Microsoft — the rhetoric has finally been toned down.

In an interview with *Computerworld Hong Kong*, Joachim Kempin, Microsoft International Products Group and worldwide OEM sales vice president, appeared eager to demonstrate that Microsoft is not the arrogant behemoth that much of the industry seems to see. Kempin was in Hong Kong earlier this month to meet with local OEMs and presumably, although he's loath to admit it, to prepare for the announcement of Microsoft Hong Kong.

Nowhere is the new approach more striking than in Kempin's references to Digital Research, Microsoft's archrival in the DOS market. While Microsoft has traditionally written Digital Research off as an also-ran with inferior products — just last month Microsoft Senior Vice President Steve Ballmer called DR DOS 6.0 a "not quite compatible DOS imitation" — Kempin went out of his way to stress that Digital Research is a capable force to be reckoned with.

"I respect the [Digital Research] guys," Kempin said. "And I believe that for me personally, they serve a purpose: Without them, I wouldn't have a good DOS. I see them as a competitor who basically makes Steve Ballmer develop a better product."

More to the point, Kempin conceded that Digital Research has the potential to encroach on Microsoft's hallowed ground by developing a graphical DOS extension to compete against Windows.

"Let me put it this way," Kempin said. "I think that'a probably the only reason why Novell bought" Digital Research.

As for whether Digital Research will actually come out with a Windows-like product, Kempin prefers to give the firm the benefit of the doubt.

"I respect [Digital Research] as a company because they have some technical expertise," he said. "And it'a just not good judgment to say, 'No, they won't ever be able to do this.' I think we should assume the worst — otherwise, we might face a couple of surprises here, and we wouldn't like that too much."

Nor does Kempin discount the rumors that IBM is preparing to license DR DOS.

Kempin said he believes that IBM would he hesitant to move away from MS-DOS, and that before it did so, it would have to "do some talking to their customers." But he's not taking anything for granted. With IBM, as with Digital Research, "for us, the best thing to do is to assume the worst," he said.

While that approach might seem out of character for a top Microsoft executive, even more surprising is that it is actually part of a broader perspective that still views IBM not only as an important ally but also as a valued customer.

"I actually don't see Microsoft and IBM in reality being extremely far apart," Kempin said. "IBM is a very pragmatic company, and whenever they can sell PCs, they'll sell Windows with them because they're interested in selling PCs."

According to Kempin, IBM is buying substantial quantities of Windows in the U.S. and Europe every month for certain markets. "So in a way," he says, "they're a customer, and I just think we should do everything to make that customer happy — despite the fact that IBM believes that OS/2 is of more value for some of their customers than Windows is. We have a difference of opinion there, but I think in the end, the customer'a going to vote."

And if Kempin has any say in the matter, we can expect to see less feuding between the giants from now on. Windows and OS/2 can coexist peacefully, he says.

"I think both companies have come to the conclusion that making differences public, which has been done over the last six months, is too hard on their customers," Kempin said. "So you're probably going to see fewer public statements from both companies.

"At the same time, we definitely are trying to make Windows a success in the market, and I think we have some momentum there. And IBM is going to try to make OS/2 successful. These two things do coexist already today in a lot of companies — you can talk between OS/2 and Windows today."

As Kempin sees it, the challenge facing IBM, Microsoft and the rest of the industry is to "get the PC market back on some kind of an aggressive growth path.

"I just think we should forget the rhetoric and look at the basics in the marketplace," Kempin said. "The key thing is to expand the market and not haggle over an operating system."

Tennant writes for *Computerworld Hong Kong*.


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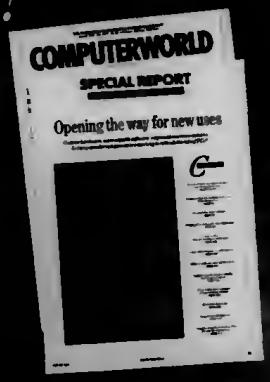


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NATIONAL
# BRIEFS

### Can't join 'em? Beat 'em

▶ Only recently, **Sierra On-Line, Inc.** was poised to merge with educational software player **Broderbund Software, Inc.** Now, the Oakhurst, Calif.-based publisher of home computer entertainment software is setting out to give Broderbund and its ilk a run for their money. Sierra announced earlier this month that it will enter the home educational software market with eight targeted offerings, the first three of which are slated to ship at Christmastime.

### Thumbs up

▶ When real-time systems vendor **Concurrent Computer Corp.** made its bondholders a tender offer as part of its ongoing recapitalization attempt, the firm conditioned its offer on a minimum 98% acceptance. Even in so narrow a corridor, the bondholders went the firm one better. Earlier this month, they tendered 100% of Concurrent's senior subordinated notes due in 1998.

### Shared in public

▶ On-line transaction-oriented application software developer **Shared Financial Systems, Inc.** filed a registration statement with the Securities and Exchange Commission for its initial public offering. The Dallas-based firm plans to go public with an offering of 2.1 million shares at an anticipated starting price in the $9 to $11 per-share range.

# Product in hand, Commtex seeks buyer

BY ELISABETH HORWITT
CW STAFF

CROFTON, Md. — For sale: one multimedia local-area network company, with market-ready product line and research and development team all intact.

Having exhausted both its capital and its prospects for new financing, Commtex, Inc. put itself on the block earlier this month — less than a year after launching a network product that is said to deliver voice, data, image and video to the user's desktop.

The fact that IBM introduced its own multimedia LAN product the previous month merely underscores the moral of Commtex's sad story: It takes deep pockets to go after an embryonic market based on yet-to-be-standardized technology.

Commtex set itself an uphill battle by announcing a multimedia LAN product so early in the industry's growth cycle, said Barbara Ells, a senior analyst at Palo Alto, Calif., research firm MWA Consulting. "I believe the year of multimedia [LANs and workstations] will occur like the year of the LAN: All of a sudden it will be there," she said.

### Stunted growth

Right now, the multimedia LAN market remains stunted because of a lack of applications and a lack of stable standards, Ells said. "Other than training and education, I think the major [multimedia] application you are looking at for normal businesses is video-conferencing." Moreover, she added, "There are still some cost barriers we need to meet to make that commonly available."

Founded in 1978, Commtex cut a swath through the IBM-compatible multiplexer industry by being one of the first third parties to offer a range of protocols for terminal-to-host connections, according to the company's chief executive officer and co-founder, Donald Parker. Starting with its first product introduction in 1979, Commtex's revenue tripled each year through 1985, he added.

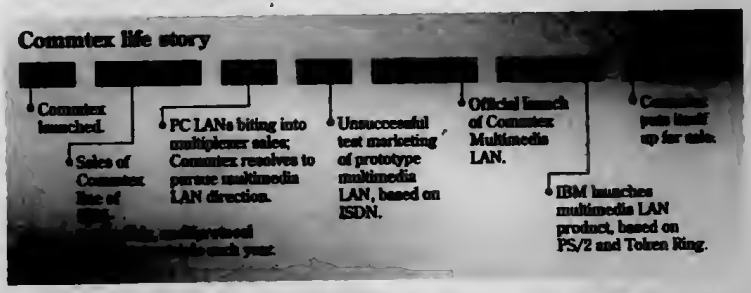
Sales began losing momentum in the mid-1980s, with the advent of personal computer LANs and LAN-based PC-to-host gateways, Parker said. Rather than chase the LAN gateway market, Parker and his colleagues elected to "leapfrog the next generation of LANs" to what they identified as the wave of the future: multimedia LANs.

Although Commtex "impressed a lot of people" with its announcement at last January's Communication Networks Conference and Exposition, the company had run through its $6 million in financing and was unable to raise a second round of venture capital. "The problem these days is that the venture community is not very venturesome," Parker said.

Venture capitalists expressed concern about the catch-22 that plagues many embryonic high-tech markets, Parker said. The problem is that a new technology needs applications to drive a mass market and bring prices down and availability up, while applications generally start to burgeon after a technology reaches a certain level of availability and cost-justification.

To make matters more difficult, Commtex elected to base its product on the IEEE 802.9 draft standard, which is not due to be finalized until next spring. There is no sign that the standard will win over multimedia vendors, Ells said. Indeed, IBM's Personal System/2 television product is not 802.9-compliant.

The primary advantage of 802.9 is that it allocates bandwidth to applications such as video, data and voice on an as-needed, dedicated basis, Parker said. In contrast, products such as IBM's, which are based on an existing LAN standard, tend to put video applications on the same bandwidth as data applications. This can limit the number of video users on the LAN — or seriously degrade data transmissions, Parker said.




The disadvantage of Commtex's approach is that it requires users to trade out their existing 802.5 Token Ring or 802.3 Ethernet boards for 802.9 boards, Parker conceded. This contributed to a major concern of potential venture capitalists: that few corporations would be willing to make major capital equipment investments in today's tight economy, he added.

Right now, Commtex's multimedia LAN product costs approximately $10,000 per desktop. However, the firm is confident it can shave as much as half of that price once mass marketing begins.

Parker said he hopes to find a buyer of "the whole company" by year's end.

# 3Com on rebound for '92, stocks imply

BY JIM NASH
CW STAFF

SANTA CLARA, Calif. — At times during the past year, 3Com Corp.'s executives must have felt like they were riding a rickety wooden roller coaster through a fire storm. But as 3Com approaches 1992, optimism about the company is on the rise.

On Wall Street, for instance, 3Com stock rebounded from a 52-week low of 5⅝ in January to 12⅝ this month — still shy of the stock's historical high upper-20s, but nonetheless an indication of renewed interest in the firm. In fact, 3Com's stock remained steady at about $11 per share through the 120-point market drop on Nov. 15.

This performance would have been hard to predict late last year, when 3Com exited the local-area network products market. The company hit its stock low within days of its announcement that 3Com would hand back its Microsoft Corp. LAN Manager-based 3+Open line to Microsoft.

Users, too, were hit hard by the strategic reversal. "I think users were disappointed that that happened because we had a lot of stock in [3Com's LAN] trade," said Sam Zerke, manager of LAN services at Iowa Power Co. in Des Moines.

At the same time, the firm said it would restructure its operations to emphasize internetworking products such as bridges, routers and wiring hubs, as well as to reinvigorate its adapter-card line. 3Com reported a $27.7 million loss for the fiscal year ended May 31.

Rearrangements at 3Com have continued sporadically since January. Many of the same network managers and industry analysts professing staunch confidence in the company through its metamorphoses also admitted to confusion about the rapid changes.

However, 3Com has shown some strengths that appear to have won over many, at least on Wall Street. Again and again, analysts point to the company's relatively strong balance sheets. Mary McCaffrey, an analyst at C. J. Lawrence in New York, noted the firm's lack of short- and long-term debt. While some companies are struggling to repay loans and meet payroll, McCaffrey said, 3Com can plow whatever profit it reaps back into the company.

### European connection

Chief Executive Officer Eric Benhamou noted in an interview earlier this year that the company enjoyed a healthy cash balance of $100 million. That cash flow helped 3Com open its first manufacturing plant in Europe just last week, employing 175 people in Ireland.

Benhamou has become a source of confidence for observers. Bob Buchanan, who served as group product manager for 3Com's distributed systems division until September 1990, said it was Benhamou who matched market needs with 3Com product strengths to come up with a strong internetworking strategy.

In addition, Buchanan said, 3Com has winnowed its 1988 complement of more than a dozen distinct product lines down to four: adapters, internetworking products, wiring hubs and communication servers.

The company is moving into a segment of networking that continues to grow at 35% to 40%, McCaffrey said. "They are coming in on the second cycle for products," including wiring hubs. 3Com can enter these niches with products that perform as well or better than existing offerings and presumably at lower prices, she said.

## INTERNATIONAL BRIEFS

### Avast, swashbucklers

▶ The software seas got a little rougher for pirates earlier this month, as the Boston-based **Business Software Alliance** (BSA) showed that the Washington, D.C.-based **Software Publishers Association** is no longer the only watchdog on the prowl. Under local copyright laws, the BSA filed legal actions against **Taiwan Hoechst**, a subsidiary of German conglomerate **Hoechst AG**, for alleged unauthorized use of software in Taiwan.

### Profits from Poland

▶ Germany's **Siemens AG** earlier this month said it has set up shop in **Poland**. The new unit, Warsaw-based **Siemens GmbH**, is expected to show average annual growth of approximately 10% during the next five years. So far this year, the parent firm said, business in Poland has added some $61 million to Siemens' bottom line. Siemens is also at work on a joint venture with local partners aimed at setting up a seven-city telecommunications market network in Poland.

### EC says 'Eureka'

▶ The **European Commission** has authorized a Dutch aid package totaling $40 million for **Philips Telecommunications N.V.** According to a commission announcement, Philips will use the money to help finance several projects under the joint European research program, **Eureka**.

# U.S. software position at risk

*Senate hears testimony that taxes, export policies affect U.S. market share*

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The U.S. Senate recently asked the $36 billion U.S. software industry how it was feeling about foreign competition. Not good, said a panel of industry witnesses. They said they are beset by a variety of ills, including software piracy, disadvantageous tax policies, unfair export rules and a dozen or so other things.

A spokesman for the Senate Commerce, Science and Transportation Committee said its hearing was not intended to support specific congressional initiatives but to see where legislative action might be warranted.

The witnesses agreed that the U.S. leads the world in software sales, citing a U.S. Department of Commerce estimate that U.S. producers pulled in more than 60% of the $65 billion in worldwide software sales in 1989.

### Self-inflicted erosion

However, Europe and Japan are getting their acts together, and aided and abetted by various ill-conceived government policies, they are eroding the U.S. position in software, industry executives said.

"I see no reason to believe that the American entrepreneurial model of software industry development is necessarily the key to the future in this industry," Joseph B. Costello, president of San Jose, Calif.-based Cadence Design Systems, Inc., said, referring to the much-publicized Japanese software "factories." "Japan is focusing its industrial policy and resources on overtaking the U.S. lead in software. And I see no equivalent American plan to keep the U.S. ahead."

**Comparison of U.S. and Japanese software development performance**

| | U.S. | Japan |
|---|---|---|
| Mean productivity (Fortran-equivalent SLOC*/work year) | 7,290 | 12,447 |
| Failures/1,000 lines during first 12 months after delivery | 4.44 | 1.96 |
| Code reuse (percent of delivered lines) | 9.71% | 18.25% |

* Source lines of code

Source: Michael Cusumano and Chris Kemerer, MIT
CW Chart: Janell Genovese

Michael A. Cusumano, associate profesor of management at MIT, said he and an MIT colleague studied 40 Japanese and U.S. software development projects and found that the Japanese had scored significantly higher in programmer productivity, quality of code and reusability of code (see chart).

Cusumano said his figures were based on Japan's top computer and telecommunications firms.

A second industry tier consists of hundreds of smaller firms whose "degree of sophistication in [the software development] process is quite low, by all accounts." It is from this quarter that Japan is likely to substantially improve its overall position, he said.

Software piracy headed the list of concerns for some at the hearing. According to Microsoft Corp., foreign software sales by U.S. firms reached $12 billion in 1989, while losses from theft totaled an estimated $7.6 billion to $9.6 billion abroad, and $2.4 billion in the U.S.

William H. Neukom, vice president of law and corporate affairs at Microsoft, said more than 95% of the copies of personal computer software in the Soviet Union are pirated.

He said Russian President Boris Yeltsin had obtained a prerelease, or "beta" copy, of Microsoft Word and had 700 copies of it made for use in the Russian Parliament Building.

Industry officials criticized export control regulations — in particular, a provision that treats widely available off-the-shelf software with encryption capabilities as "munitions" requiring export approval by the U.S. Department of Defense. Neukom estimated that the restriction, if not removed, would put at risk or potentially delay U.S. exports worth $3 billion to $5 billion in five years. He called on the Senate to adopt a provision in a bill, passed recently by the House of Representatives, that would decontrol software of the type that is available at retail stores around the world.

Robert N. Miner, senior vice president and co-founder of Oracle Corp., expressed alarm at a Defense Department proposal to block the export of reduced instruction set computing workstations to China and the Soviet Union unless the machines are first altered to make them less potent. That would amount to a unilateral reversal of more liberal export rules worked out among the U.S. and its allies earlier this year, he said.

### Tax provision opposed

Software firms continued their campaign against an administration proposal to impose a mandatory 14-year write-off period for intangible assets, including software. They pointed out that most software outlives its usefulness in less than five years and said the provision, contained in a House "tax-simplification" bill, would boost the cost of software by deferring tax deductions [CW, Oct. 7].

A number of industry emissaries called on the government to do more to encourage research and education.

Laszlo A. Belady, chairman of Mitsubishi Electric Research Laboratories, Inc. in Cambridge, Mass., and previously a senior official at IBM's Tokyo Research Laboratory, said, "Even IBM . . . has been late to recognize the need for tools and training for those involved with software work. Instead, the saying was that all you had to do was hire bright people to do the job."

# Research tax credit in danger; deadline nears

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Bipartisan groups in two tax-writing committees of the U.S. Congress introduced eleventh-hour legislation earlier this month that would extend for one year a dozen tax incentives, including the research and experimentation (R&E) tax credit, due to expire at the end of the year.

But the legislation's sponsors face a challenge — the need to find offsetting tax revenue — and computer industry officials fear their firms may face higher R&E costs next year if the new bill fails to pass.

Chuck Jacob, manager of government affairs at Apple Computer, Inc., said Apple spends between $400 million and $500 million annually on R&E, even a temporary loss of the tax credit could significantly affect research. "Apple will do R&E whether or not we get the credit. The question is how much."

Jacob said that longer term, riskier investments — ones with potentially high payoffs — will be the first to be sacrificed by the industry if the credit disappears.

For years, industry and some members of Congress have sought to have the tax credit for R&E, first established in 1981 and renewed periodically since then, made permanent. They have argued that the annual uncertainty over the credit inhibits innovation. This year, the campaign to carve the credit in stone has had an unusually hard time because of the political requirement that any measure that reduces tax collections contain revenue "offsets" so as not to worsen the budget deficit.

The tax credit is intended to apply to incremental investments. As it is now structured, it gives a 20% tax credit for qualified R&E — but not product development — expenditures that exceed a company-specific base amount. The base is the greater of the most recent three-year average of qualified expenditures or 50% of current year expenditures.

### One-year extension

The two tax committees, the House Ways and Means Committee and the Senate Finance Committee, estimated that a one-year extension of the R&E tax credit would reduce tax collections by $1.1 billion over five years. A spokesman for Sen. Jack Danforth (R-Mo.), a member of the Senate panel, said finding the revenue offset is no problem. "We just haven't chosen to do it yet." Nevertheless, Danforth said he hopes to have the measure enacted by the time Congress adjourns later this month.

If that deadline is not met, the tax credit will lapse, and its supporters will introduce legislation next year with a provision to make the credit retroactive to Jan. 1.

In the meantime, Senate and House bills that would make the credit permanent appear dead for now, observers said.

Lawmakers are also considering a companion issue: a temporary moratorium on the implementation of a 1977 tax rule that requires U.S. companies with overseas operations to allocate a portion of their domestic R&E expenditures to income earned abroad. The intent is to match R&E outlays with the revenue streams that are produced by them.

Computer companies said that is unfair because the lost credit generally cannot be recouped from the countries where the sales occur. They also said it provides a disincentive to conducting research in the U.S.

**Research and experimentation (R&E) tax credit — what you get**

Firm can deduct 20% of its eligible base.

Eligible base = either the average of previous three years qualified R&E expenditures or 50% of the current year's expenditures — whichever is greater.

To get the best possible tax break, the smart firm will keep careful records.

Source: U.S. General Accounting Office
CW Chart: Janell Genovese

# What drives bosses up the wall . . .

BY JULIA KING
SPECIAL TO CW

To hear information systems managers tell it, computer programmers and systems analysts fall in love more than perhaps any other category of worker.

IS professionals, it seems, just can't maintain a professional distance from tools and technologies. Frequently the affairs are fleeting; sometimes they are both long and intense. In either case, managers say, the attachments can be counterproductive.

Some IS professionals are fickle types. They fall in love with smaller and faster personal computers and glitzy software with lots of bells and whistles. They swoon for new operating systems and database tools. In short, their bosses say, they respond to new technologies like glandular teenagers — madly infatuated one month, on to something else the next — usually as soon as the first object of their passions has been purchased.

Others find a technology or two they like and seemingly bond for life. In its own way, the managers say, this can be as much or more of a problem than the gadfly infatuation. Often, these faithful sorts spurn other, more appropriate tools in favor of systems and software with which they are familiar.

Even putting these problems aside, IS technophiles of every stripe often exhibit one particularly irksome trait, managers complain: They focus on what they love to the exclusion of almost everything else.

Because they are so distracted by desktop gadgetry, managers say, many workers never develop a big-picture view of their company's business and of how their work fits into it.

"Too often, programmers look at problems as just technology problems," says Charles Lasky, director of MIS at Dorr-Oliver, Inc., a manufacturing company in Milford, Conn.

Also frustrating, managers say, is IS workers' tendency to indulge their own interests, delving into the features of a technology that interests them but ignoring details that are very important to the organization and end users. This is particularly apparent, managers say, in the software development area. Programmers will spend endless amounts of time exploring the capabilities of a new applications development tool but then give short shrift to the documentation and testing of the systems.

"Programmers will say they have tested a program, but before a user gets to the first prompt, the program bombs out," says Timothy Kahn, MIS manager at Sonoco Fibre Drum, Inc., a manufacturing firm in Marietta, Ga.

Paulette Bogan

Mason notes that poor documentation is partially explained by the constant pressure put on programmers. "Once a programmer gets a problem solved, there are other users screaming for them to do something else. So in some ways, it is understandable that they go on to the next problem rather than document," he says.

For all of their various complaints, managers seem to agree on a single and fairly straightforward solution: better and more direct communication between IS staff members and their ultimate critics — the end users.

To this end, Kahn has set up a system whereby programmers and other IS personnel meet face-to-face with users to discuss data processing and programming requirements. Similarly, Mason has instituted monthly meetings between programmers and users at Georgetown College in Georgetown, Ky.

Meanwhile, Black & Decker Corp. has devised what it hopes will be a cure for IS professionals suffering from unreasonable attachment to outmoded technologies.

Recognizing that it is management's responsibility to help workers "break old habits," the company has established work centers where IS employees can experiment with newer PC-based technologies.

# . . . and what they do to get on everyone else's nerves

If the quality of communications between users and IS departments is poor, IS staff members say, a lot of the blame for the static belongs to IS managers. When IS managers act as go-betweens, staff members explain, vital information from end users is often lost or misinterpreted.

Paulette Bogan

Working in IS at the Federal Reserve Bank in Richmond, Va., is like playing a never-ending game of whisper down the lane, systems programmer Deborah Stein says.

The game works like this: A user tells his supervisor what he needs from the IS department. That supervisor then tells an IS supervisor who tells Stein. Rarely during the process does Stein talk to the users whose problems she is expected to solve.

David Maynard, a programmer analyst at Matthew Bender Co., a Menands, N.Y., publishing firm, also reaches for game analogies when describing how messages are filtered through IS management. When your instructions come from an IS manager, the process of writing a computer program can be like assembling a jigsaw puzzle with several pieces missing, he says.

"In many cases, it seems that information crucial to the scope of a project is withheld . . . so that you can be more than halfway through a project without having all of the information you need," Maynard says.

What would be far preferable, according to Stein, is direct communication between IS staffs and users.

Even when IS managers are easy to understand and transmit user requests clearly, what they ask for doesn't always make a lot of practical sense, IS professionals say. If muddy communications is the No. 1 gripe from IS staffs about their managers, No. 2 has to be unrealistic demands.

"A lot of the time, people in IS management haven't gone up the technical side of the business, and they have no idea what programmers face," says Gary Cerreta, a senior programmer analyst at Matthew Bender and a former IS manager.

Lack of technical expertise often translates into insensitivity to the resource requirements of projects, both during and after the build. "Some managers aren't concerned that it could take 24 hours a day for the next three months to accomplish what they want," observes Bob Boden, a systems programmer at the Lee County Tax Collector's Office in Fort Myers, Fla. Other IS professionals note that there is often no time set aside for postdevelopment testing and fixes.

Still, other IS managers seem completely unaware or uncaring that the work of a programmer or analyst is not something that can be completed, then shelved. Rather, it is an ongoing process of fixing and updating, which involves knowing the specific requirements of the users and managers whom programmers are charged with keeping productive.

What's really galling, IS professionals say, is that when something goes wrong because a project delivery was rushed, managers are seldom willing to admit that they could be partially at fault.

Managers must also assume at least partial responsibility for what is perceived as workers' inadequate knowledge about their companies' overall business, according to Will Williams, a principal software engineer at Lotus Development Corp. in Cambridge, Mass.

In his two years at Lotus, Williams says his department has gone through no fewer than four reorganizations, two of which he learned about only after they had taken place. If IS staffs are ever going to become more knowledgeable about a firm's business and strategy, managers must do a better job of communicating that information, Williams says.

King is a free-lance technology writer based in Ridley Park, Pa.

# Networking skills still in high demand

*Fast Track is a twice-monthly column dedicated to answering questions on career directions.*

BY MAX MESSMER
SPECIAL TO CW

**Q I was laid off three years ago after many years at a major company, and I have since been caught up in three additional layoffs. While I have 20 years of experience in Systems Network Architecture, X.25, 3270/370 and local- and wide-area networking, I'm finding that the skills I have are no longer in demand. Is my knowledge on longer needed?**

*Initials and town withheld*

A Quite the contrary — you are to be commended for your perseverance and should not be disenchanted. If your skills were not marketable, you would not have been able to find three new jobs after being involved in several layoffs.

The telecommunications/LAN/WAN/networking arena has many immediate needs as a result of explosive growth in microcomputers, midrange systems and mainframe cooperative processing. As the trend toward downsizing computer systems and decentralizing resources continues, networking skills will remain highly sought-after.

It can be frustrating to be "trapped" in so many cutback situations. Take extra care in evaluating the financial strength, prospects and market situation of your prospective employers.

**Q I graduated three years ago with a double major in computer science and management. I'm still working at the job that supported me through college, and the job doesn't use any of the skills I learned in school. Though I dislike programming, I'm interested in management and MIS. Should I return to school for an MBA or a master's degree in MIS, or do you think my education in sufficient?**

*Initials and town withheld*

A Early in a career, academic credentials can earn you consideration for a better job. If you decide to go back to school, you should consider the MBA over a master's in MIS. Your undergraduate degree already gives you a technical background. And since you don't seem inclined toward a technical career track, additional technical education is not likely to help you.

**FAST TRACK**
**CAREER ADVICE FOR THE '90s**

**Q Do you have any information on careers in computer graphics or computer-aided engineering (CAE)?**

*J.C.*
*Lowellville, Ohio*

A You've selected two very exciting fields to investigate. Computer graphics has become very popular as both a way to improve the presentation of electronic information and to make the computer easier to use. CAE and computer-aided design are also very promising fields because of the tremendous efficiencies they make possible in engineering.

Many industry associations and special interest groups are specifically geared toward these areas. For even more in-depth information, you might consider attending one of the many trade shows where vendors and developers of CAE and graphics demonstrate their products. For example, the Association for Computing Machinery hosts Siggraph, an annual graphics engineering show. At these shows, you will also be able to explore such specialty areas as graphical user interface applications and desktop publishing.

**Q I would like to know more about opportunities available in the development of music software using Musical Instrument Digital Interface (MIDI).**

*Initials and town withheld*

A Relatively few companies are seeking individuals to work in MIDI development. Most of the "sound-related" opportunities are in the research and development areas of software development firms working on various multimedia applications. These positions typically call for advanced academic degrees and knowledge of artificial intelligence and object-oriented coding in the application of advanced technology.

Messmer is chairman of Robert Half International, Inc., which places permanent and temporary IS professionals in the U.S. and abroad.

*We welcome your questions. Send them to Cathy Duffy, Careers Fast Track,* Computerworld, *375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. Letters may be edited for brevity and clarity. Your initials and town will be printed unless you request otherwise.*

# TIP of the MONTH

## Conquering conferences

***Getting maximum benefit from attending industry conferences and trade shows is essential for busy, expense-conscious information systems professionals. Here are some easy pointers on how to squeeze the most value out of the time and money invested:***

▶ Take some time beforehand to think about exactly what you'd like to accomplish — people you'd like to meet, products you want to review and questions you want answered — and then plan your schedule accordingly.

Make appointments in advance with people you want to meet at the conference. It's hard to pin down colleagues once they are wrapped up in the conference whirlwind. Yet, most professionals will honor a commitment to meet if you set the date and time a week or so ahead.

▶ Take along some technology of your own. Most savvy IS travelers know how to turn their hotel rooms into instant offices with notebook or portable personal computers equipped with mini modems and fax boards. Many IS conference attendees are also using palmtop computers that serve as business calendar, personal phone book, electronic memo pad, calculator and file manager.

That trusty old standby, the tape recorder, can also be an invaluable aid in capturing information for subsequent use. With an omnidirectional microphone plugged into an inexpensive portable tape recorder, attendees can save entire speeches and seminars (with the speakers' permission, of course), to be shared with co-workers back at the office.

▶ Break bread with people you meet at the conference. Sharing a meal with new acquaintances is an excellent way to build your network of personal business contacts. It's not necessary to devote hours to a formal meal or to pick up the bill. At smaller conferences or seminars, suggest to colleagues that you talk shop over a burger and split the tab. At huge shows such as Comdex, where the atmosphere is not conducive to relaxed meals, pop into parties and make yourself visible at events. Be sure to wear your name tag and keep business cards handy.

Conferences and trade shows are among the best places to meet peers who share your interests, challenges and concerns. It is a lot easier to follow up with people after the fact if they know who you are.

*Written by Jill Vitiello, a free-lance writer based in East Brunswick, N.J.*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- PL1
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- DB2/SQL
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SYSTEMS DEVELOPMENT ENGINEER/ASIAN MARKETS: Position of Systems Development Engineer/Asian Markets is to apply necessary computer software development and programming criteria to support financial instrument trading on the Tokyo, Osaka and Singapore stock exchanges. Job includes: (1) development of master globally available price data base; (2) development of related specifications; (3) development of necessary supporting numerical analysis, statistical evaluation, and data base file system, and distributive computer system design; and (4) implementation, oversight and monitoring use of same. Special requirements: candidate must have programmed with C and FORTRAN computer languages, must have worked with Oracle relational data base system, must have worked with UNIX computer operating system, and must have programmed real-time data processing applications. Position requires 5-6 years of college, with a M.S. degree in Computer Science. Must have one year of experience in this position or 6 months experience as computer programmer (real-time). Position is exempt (no overtime), for 40 hours per week. Daily schedule 7:30 AM to 4:30 PM. Basic Salary is $38,500 per year. Must have proof of legal authority to work permanently in the U.S. Submit applications to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605. Attention Martha Caragena, Reference #V-IL-3482-X. NO CALLS. AN EMPLOYER PAID AD

Hardware Design Engineer: Will design, test, modify and develop hardware computer interfaces including wire and wireless data links, modems and networking protocols using radio frequency transmission for use in personal computers. Will implement a hybrid system of communication circuitry and computer circuitry including circuit board design and modification. Will code and debug in assembly language to support overall hardware design. Will perform related quality control and quality assurance tests to determine modification of design including computer interface. Requires B.S. degree in Electrical Engineering or Computer Science. Also requires one year experience in the job to be performed or one year experience as a Hardware Design Engineer. Education to include completion of two courses in Principles of Radio Receiving and two courses in Radio Transmission. Entire experience to include hardware computer interface design. Hours: 10:00 a.m. - 6:30 p.m. 40 hours per week at $29,950 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Il. Dept. of Employment Security, 401 S. State St. - 3 South, Chicago, IL 60605, ATTN: Mary Miles, Ref #V-IL 3073-M. No Calls. An Employer Paid Ad.

PROGRAMMER ANALYST wanted. Duties: Systems analysis, design, development and maintenance of information systems for clients including system external specifications, internal specifications, coding and testing of LINC, COBOL & DMS II programs and maintenance of the system on Unisys A series computers and IBM PCs. Need a Bachelor's degree in Computer Sc., Engg., Sc., Systems Analysis or its equivalent and 2 yrs. exp as a Systems Analyst, Programmer Analyst, Programmer or Consultant. The related exp must include software development using each of the following: Unisys A series, IBM PC, LINC, DMS II, COBOL 74, WFL, dBase III+, CLIPPER, and FOXBASE. Pay is $45,000/yr. 40 hr/wk. Resumes to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. #74091 Employer Paid Ad.

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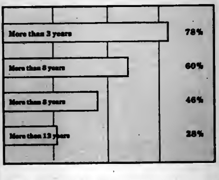
**Years in Current Job Function Reported by Computerworld's Audience of 629,204**




Source: Skill Survey of Computerworld's Audience, May 1989.

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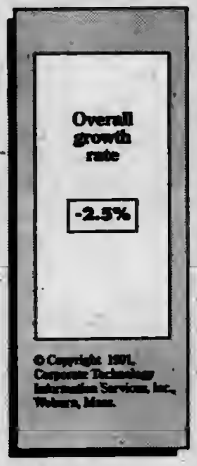
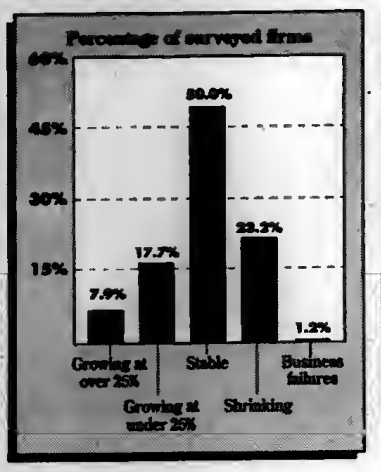
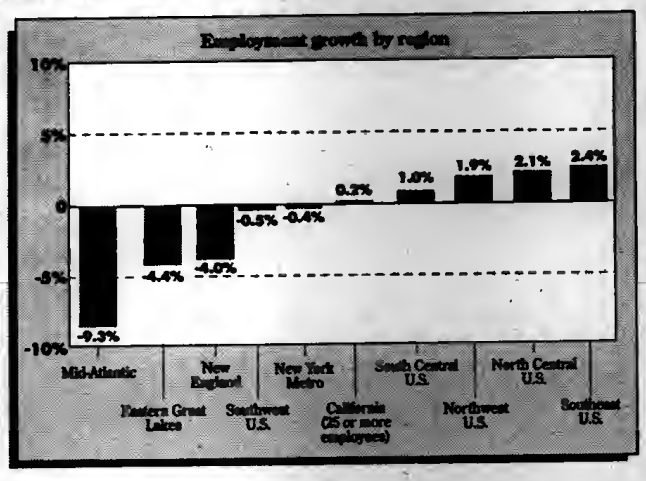
# Computerworld/Corptech Career Index

**The transportation industry had almost as many businesses shrinking or failing last year as it had growing. The top region was the Southeast, which expanded at a modest 2.4%, while the Mid-Atlantic whittled 9.3% off its work force.**





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**Suburban Atlanta Location**

Solvay Pharmaceuticals, a subsidiary of the international parent company Solvay S.A., is positioned as an innovative, multi-therapeutic force in the pharmaceutical community. Our commitment to staying on the leading edge in the health sciences field is reflected not only in our products and R&D, but in the technical services side as well. Currently, we have an opportunity for a Network/HP Systems Specialist to maintain and enhance the HP 3000-932, and the communications network, along with integrating the HP and DEC platforms for the company's worldwide system.

The experienced, multi-faceted professional we seek will play a dual role in the organization. As the HP Systems Specialist you will need superior knowledge of HP hardware/software including: MPE/XL, All Base and systems security. On the Network Specialist side, excellent knowledge of telecommunications hardware/software including: voice communications, WANs, LANs, NS3000, DECnet/LAT and data switching equipment is essential.

Our suburban Atlanta location offers an affordable lifestyle rich with cultural and recreational diversions. Our salary and benefits package is extremely competitive and includes relocation assistance. Qualified candidates may send their resume to: ***Solvay Pharmaceuticals, Attn: Kay Yoest, 901 Sawyer Road, Marietta, GA 30062.***

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Computer Animator/Graphics Software Engineer responsible for creating 3-Dimensional objects using the ALIAS/1 3-D animation system, and controlling the movement and coordination of these objects, as well as their rendering and coloring; conducting logical analyses of operational technical problems and formulating simulation models by designing storyboards, layouts and conducting element breakdowns in preparation for computer animation; illustrating simulation models using surface modeling, shading algorithms, and keyboard scene manipulation; controlling hierarchical animation using nodes of a directed acyclic graph; utilizing mathematical software in image processing, motion algorithms, surface and geometry modeling; creating animation, illustrations, key-frames, tweens, inking, painting and other aspects of computer graphics that result in the creation of computer animation for company's clients in the industrial and broadcasting fields; performing validation and testing of simulated models to ensure adequacy and determining need for reformulation when necessary; analyzing the firm's Electronic Data Processing projects to determine equipment requirements and planning layout and implementation of systems to achieve appropriate designs. Applicants must possess Bachelor's degree in Computer Science and Electrical Engineering plus two years of experience in job offered or two years as Graphics/System programmer and/or Video and Animation Product Manager. Experience must have included creating 3-dimensional objects using the ALIAS/1 3-D animation system, controlling hierarchical animation using nodes of a directed acyclic graph; utilizing mathematical software in image processing, and utilizing image processing software to interface with ALIAS Animation System with external effects devices. 40 hrs., 9 a.m. to 5 p.m., $39,900-$74,500 per annum. Must have proof of legal authority to work permanently in the U.S. Send resume to Illinois Department of Employment Security, 401 South State Street, Three South, Chicago, Illinois 60605, Attn: D. Ruiz, Ref.# V-L 4320-R. NO CALLS. AN EMPLOYER PAID AD.

PROGRAMMER/ANALYST (CONSULTANT) - With minimal supervision, provide programming analysis services in project design, development and implementation of communications, financial management information, commercial systems and sophisticated text processing applications. Develop and implement systems interface including systems database and program design, coding and testing enhancements. Develop, write, code and implement new application programs to meet current and projected client needs. Duties entail work with PS/2, OS/2, MS-DOS, Microsoft Windows, C, ASSEMBLY and Real Time Interface. Must have Master's in Computer Science or Engineering or Math. Experience required is six months in job offered or six months as a Systems Analyst or Engineer or Graduate/Research Assistant or Technical Specialist. Additionally, experience must involve use of PS/2, OS/2, MS-DOS, Microsoft Windows, C, ASSEMBLY and Real Time Interface. M-F, 40 hrs/week, 8:00-5:00; salary $32,000/year. Boca Raton, FL location. Must have proof of legal authority to work in the U.S. Send resume to Job Service of Florida, 105 E. Broward Blvd., Ft. Lauderdale, Fl. 33301-3502. ATTN: J.O. #FL 0520880. EOE.

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|---|---|
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| Sales/Marketing | 30,912* |
| Corporate Management | 77,805 |
| End User/Other Professionals | 33,146 |
| Other | 52,652 |
| Total | 629,204** |

SOURCE: Skill Survey of Computerworld's Audience, May 1989.
* Includes 8,673 complimentary copies distributed to computer sales and marketing professionals. ** Total readers or paid subscriber copies (does not include 8,673 complimentary copies)

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L.L. Bean, the nationally known New England-based retail and catalog merchandiser of outdoor sporting equipment and apparel, is once again, expanding its data resource management function. We are looking for experienced professionals to contribute to our roll-out of information engineering approaches and to the implementation of key corporate information bases. We seek candidates for the following:

## Data Analyst

Position requires 6+ years in the Information Services field with at least 2 years in data administration or business systems analysis and design. A strong business orientation and experience in logical data modelling are required, experience with CASE tools is preferred. Excellent interpersonal and communications skills are essential. The ability to facilitate JAD sessions as well as project management experience are highly desirable.

## Data Base Analyst

Position requires 6+ years in the Information Services field with in-depth experience using a relational database management system. Experience in physical database design through application development or database administration positions, excellent interpersonal and communications skills, understanding of logical data modelling and experience with CASE tools are all essential. DB2 experience is a plus.

L.L. Bean offers competitive compensation packages. To be considered, please send a cover letter, salary requirements and resume, to: ***Paul A. Collet, Sr. Staffing Specialist, L.L. Bean, Inc., Casco Street, Freeport, Maine 04033.*** Only cover letters stating salary requirements will be considered. An equal opportunity employer.

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Due to recent departmental planning studies, we have a significant backlog of technical and application development projects. We are currently seeking the following:

## APPLICATION DEVELOPMENT AND SUPPORT

### SYSTEMS ANALYSTS

Positions require at least 4+ years of structured coding experience. Highly desired experience would include COBOL, CICS, DB2, DATACOM, and a background in a structured environment using a formal project life cycle methodology. Excellent communication and leadership skills are essential for these positions. A four-year degree is preferred.

### DATA ANALYST

Position requires 4+ years experience in data administration, database administration, or systems development. At least 1-2 years experience in logical or conceptual data modeling is also required, as well as experience with CASE tools. Excellent interpersonal and communication skills are essential, and JAD facilitation skills are highly desirable. Some task or project management experience is also desirable. A four-year degree is preferred.

There are few areas in the country as attractive as the Carolinas. The landscape is famous for its rolling hills and magnificent fall colors. The capital city of Raleigh, location of our headquarters, is known for its nationally recognized university programs, sports and proximity to both beach and mountain resorts. Despite its growth, the region has maintained a moderate cost-of-living and its southern charm.

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Candidate must possess 3-5 years analysis, design and programming experience with the Walker Interactive Systems using the Productivity tools-Reportbuilder, Inquirer and Screenbuilder. Stronger candidates will also possess experience with COBOL, FOCUS and EXEC2/REXX in the IBM 30XX VM/CMS environment.

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Candidate must possess 3-5 years accounting experience, preferably in Financial Accounting. A strong computer background with experience in analysis, design and development using the Walker Interactive Systems General Ledger and Productivity tools is required. Stronger candidates will also possess experience with Walker's Reportbuilder, Inquirer and Screenbuilder.

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The position is responsible for planning, organizing, administering and evaluating all computer and information system operations of the College. Special attention will be given to integration of operations with units and persons to assure the success of the whole system. Administrative and academic support services are to be provided. Emphasis on the evaluation of services, software and hardware is expected. Leadership for staff in the computer center is an essential prerequisite for these activities.

**Qualifications:** Master's Degree in Business Administration, Computer Sciences, Computer Engineering, or directly related field WITH a Bachelor's Degree in Computer Science or a related field. Minimum of ten years experience in information systems with five or more years experience managing in a large scale systems environment. Functional experience in business/departmental management, application development, package systems implementation, project management, networking, voice and data communications required.

**Technical Backgrounds:** Familiar with IBM large mainframe systems including: VM (SP, XA, or ESA); MVS (SP, XA or ESA); VTAM, JCL, local and wide area networking; CMS; VSAM, CA/DATACOM, DB2 databases; CICS

Salary for this position is competitive for the area, experience and responsibilities outlined. Excellent benefits.

Applicants will be required to complete an application form and provide a current resume, copies of transcripts for all degrees earned (photo copies acceptable), and salary history.

To receive an application form, please call the Human Resources Department at (313) 540-1579. Please refer to position no 91-57-w

**Deadline to apply:** completed applications must be returned by 5:00 p.m. on **Friday, December 20, 1991** (postmarks not accepted).

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We also require at least 3 years post high school education with a concentration in electronic technology and computer logic.

Selected individual will be required to work 40+ hours per week with overtime and be on call 24 hours, 7 days. Some travel involved.

If you meet the above qualifications, please apply at the Texas Employment Commission, Dallas, TX or send a resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #6499297.

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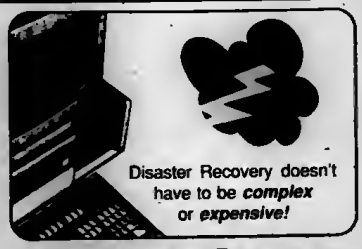


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# Ambiguity spells contract woes

BY DENNIS S. DEUTSCH
SPECIAL TO CW

Everyone's heard the expression, "Get it in writing." Well, even that may not be enough if you're not careful with the wording of your contracts.

This industry continuously develops new technology that may have different meanings to different people. Ask your colleagues to define "outsourcing" or "platform," and no doubt, you will receive a somewhat different definition for each. Precision and a total absence of ambiguity should be the goal for information systems professionals entering any kind of contract, given the resulting potential for confusion.

I am currently involved in a lawsuit in which the vendor's contract provided the following warranty: Vendor "warrants that the software provided pursuant to this contract shall perform substantially as described in the documentation."

This simple sentence presented no problem at the time of contracting. But the meaning of the term "documentation" became the center of controversy.

As it turns out, the IS buyer was looking for a certain functionality within the software. The existence of that functionality was presented to the buyer in an eight-page booklet during a sales presentation. The vendor denies that the sales booklet was ever part of the documentation referred to in the contract.

There is no doubt that the booklet distributed by the vendor at the sales presentation contained information relevant to the purchase. But was this "documentation" as we understand it in the computer context? Did the IS buyer have a right to reasonably interpret the contractual term "documentation" to include the booklet? The seller intended that the contract refer only to the system documentation delivered with the software.

The lawsuit could have been avoided if the IS buyer or vendor rewrote that one sentence to read: Vendor "warrants that the software provided pursuant to this contract shall perform substantially as described in the documentation consisting of the following manuals provided by vendor . . ." And then, of course, each of the system manuals should have been listed by title, date and serial number, if any.

Here is another example. I served as an arbitrator for one dispute in which the IS manager signed an agreement to obtain a turnkey system. The IS organization was contractually bound to acquire any "CPU upgrades" from the same vendor.

That term was then the subject of the dispute. What was meant by the term "CPU upgrade?" The contract was silent as to its meaning. Was it meant to include only CPUs of the same manufacturers with greater memory? Did it extend to new CPUs of other manufacturers with the same capacity? Or perhaps it was the intention of the parties involved for the terms to have some other meaning.

More than likely, the parties never fully thought about the potential ambiguity in that agreement. And neither of the attorneys representing these two professionals counseled them that these terms would best be defined in the agreement. After three days of hearings, the parties reached their own settlement of this dispute.

### Failure to define

Consider this additional dispute arising out of a failure to fully define terms in a computer agreement. Even terms as basic as "software" can cause a problem.

In one instance that I know of, an IS manager obtained a computer system, management software, software to interface with a compact disc/read-only memory (CD-ROM) and a monthly update of a CD-ROM database from one vendor. Although the CDs were supplied by the vendor, the vendor was simply passing them through from a supplier. The vendor warranted all software it distributed.

When errors in the database began causing problems, the vendor denied any liability. It claimed that the information contained on the CD-ROM was not software and, therefore, was not subject to the warranty. Does the software include the database in this circumstance? The jury is still out on this case.

It is always the wiser choice to take the time at the point of contracting to consider what terms may lead to various interpretations and to negotiate a definition for those terms. It may lead to a longer, thicker contract. However, a few sheets of paper and a few extra hours of negotiation are far less expensive than suing or entering into alternative dispute resolution.

Deutsch is an attorney specializing in computer law in Hackensack, N.J. He serves as an adjunct associate professor of law at Fordham University School of Law.

## Word traps

The following is a list of troublesome terms that should be defined in a contract:

- Upgrade.
- Modification.
- Software.
- Release.
- Training.
- Maintenance.
- Support.
- Documentation.
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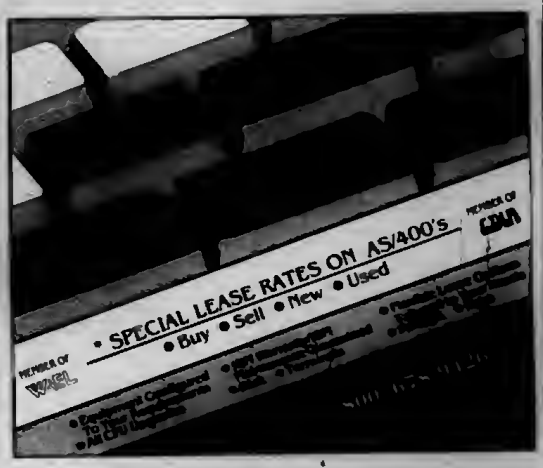


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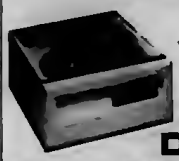

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# ADVERTISERS INDEX


Andersen Consulting ....................56
Avatar Corp ....................47

BMC Software ....................26
Borland International ....................C4
British Telecom North America ....................45

Candle Corp ....................14-15
Chipcom ....................C3
Codex Corp ....................71
Command Technology ....................39
Compaq Computer Corp ....................22-23, 36-37
Computer Associates ....................3, 18-19
Computer Systems Advisers ....................10
CW Circulation ....................75
CW List Rental ....................76
CW Recruitment ....................55

Digital Equipment Corp ....................42-43, 51-54

ERI ....................32-33

Hewlett-Packard ....................44

IBM ....................68
Information Builders ....................13, 38
Innovation Data Processing ....................7
ITAA ....................70

Lexmark ....................12
Lotus Development Corp ....................48-49

Micom ....................55
Micro Focus ....................35
Microsoft ....................16

Network Systems ....................46
Networld ....................62
Next Computer ....................34

Oracle Corp ....................5, 9

SAS Institute ....................59
Software Engineering of America ....................11
Sybase, Inc. ....................17

Texas Instruments ....................28-29

Unix System Laboratories ....................30

Wang Laboratories ....................21


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# INDUSTRY ALMANAC

## CONFERENCE CALLS

***Bear, Stearns & Co. recently conducted a series of conference calls for clients to review the New York-based brokerage firm's outlook for technology stocks. Following are some important points.***

**Novell, Inc.**'s stock has outperformed most of the technology sector during the past year, jumping from $13 to $50, but it is still worth buying. With its dominant market share and the ability to connect IBM Personal Computers and compatibles, Apple Computer, Inc. Macintoshes, Unix workstations and various large systems, Novell will play a central role in helping user companies implement client/server computing.

**Autodesk, Inc.** is a controversial stock because despite a good growth record, the company is in transition. President and Chief Executive Officer Alvar Green will retire soon, and the new chief will have to diversify Autodesk while maintaining its dominance in the computer-aided design market. Right now, the company relies heavily on its flagship Autocad, which brings in about 90% of sales.

**Pyramid Technology Corp.** is riding all the major trends — parallel processing, symmetrical multiprocessing Unix, distributed databases and reduced instruction set computing. Pyramid is working closely with AT&T to convince NCR Corp. to carry the product line as a niche system. On the surface, it seems that progress is being made; NCR actually sold some Pyramid systems last quarter. A relationship with NCR would boost the perception of Pyramid stock. Buy now. Growth will be driven by the new relationship with Olivetti USA and an expanded U.S. direct sales force.

**Conner Peripherals, Inc.** gets about 10% to 15% of its business from Compaq Computer Corp., an agreement that may be subject to revision in view of the upheaval at the PC firm. Meanwhile, Conner is positioned to pull ahead of other peripherals firms that are cutting back on research and development spending. Stock is rated buy.

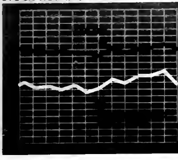
## RECOMMENDATION CHANGES

DOWNGRADING FROM BUY TO HOLD: **Advanced Logic Research, Inc.** (Prudential Securities, Inc.). The new, aggressively priced upgradable notebook family should put ALR into a competitive position in that fast-growing market. However, the outlook for the immediate future is uncertain. Excess inventory in the distribution channel, exacerbated by price protection from the company's recent large price cuts, is causing problems for ALR's bottom line. Distributors and resellers have their reorders but are waiting for the new products. Sales last quarter of Intel Corp. I486-based machines were flat with the same period last year, except for the 486SX models, which increased.

DOWNGRADED FROM BUY TO HOLD: **Digital Equipment Corp.** (Prudential). DEC is making gradual, although fitful, improvements; the picture will not look much brighter for nine to 12 months. Not only has the new product cycle not begun, but European sales have also worsened beyond what was anticipated. International business has contributed more than 60% of DEC's revenue, and Europe probably represents more than 40% of that total. Service sales and expense controls should be fine for the coming two quarters, but product revenue and margins are vulnerable, especially the high-end, high-ticket items.

KIM S. NASH

## STOCK TRADING INDEX



## THIS WEEK'S HIGHLIGHTS

- Technology stocks sank last week overall, which did not help Lotus Development Corp. Executive shake-ups at the firm (see story page 1) apparently further spooked investors, who stomped Lotus down 5¼ points to 22.
- Talk of layoffs at IBM preceded a 4⅝-point stock drop last week, to close Thursday at 95¾. Knowledgeware, Inc. announced layoffs; U.S. stock gained ½ a point to 12.
- Digital Equipment Corp. fell 3⅛ points to 60⅝, and Apple Computer, Inc. closed at 51, down 3¾ points. DEC said it will market Apple products in Europe.
- Personal computer clone maker Dell Computer Corp. reported happy quarterly earnings news and added a director to its board last week. Its stock slid ⅝ of a notch to 23¼.
- Teleconferencing equipment maker Compression Labs, Inc. plummeted 5⅝ points to 22⅜, while rival Picturetel Corp. was among last week's few gainers. It picked up ½ a point to close Thursday at 40½.

# Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, NOVEMBER 22, 1991

| TOP PERCENT GAINERS | |
|---|---|
| System Software Assoc. | 16.33 |
| BMC Software Inc. | 15.43 |
| Televideo Systems | 12.40 |
| Anacomp Inc. | 12.00 |
| Micropolis Corp. | 11.67 |

| TOP PERCENT LOSERS | |
|---|---|
| QMS Inc | -21.55 |
| Autodesk Inc | -19.88 |
| Artel Communication Corp | -17.88 |
| Lotus Development | -14.14 |
| IPL Systems Inc. | -13.89 |

| TOP DOLLAR GAINERS | |
|---|---|
| BMC Software Inc. | 6.88 |
| Borland Int'l | 7.50 |
| System Software Assoc. | 4.00 |
| Silicon Graphics | 3.38 |
| Novell Inc. | 2.63 |

| TOP DOLLAR LOSERS | |
|---|---|
| Autodesk Inc. | -7.00 |
| Matsushita Electronics | -6.00 |
| QMS Inc. | -4.88 |
| Adobe Systems Inc. | -4.75 |
| Lotus Development | -3.50 |

**Communications and Network Services — Off 3.46%**

| Exch | 52-Week Range | | | Nov 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| OTC | 12.63 | 8.50 | 3COM Corp | 11.00 | 0.13 | 1.15 |
| NYS | 69.75 | 55.75 | American Info Techs Corp. | 59.63 | -2.13 | -3.50 |
| NYS | 40.38 | 25.00 | AT&T | 36.38 | -0.75 | -2.02 |
| OTC | 4.13 | 0.88 | Artel Communication Corp. | 1.75 | -0.38 | -17.88 |
| NYS | 56.25 | 43.00 | Bell Atlantic Corp. | 45.13 | 0.00 | 0.00 |
| NYS | 66.25 | 69.13 | Bellsouth Corp. | 69.75 | -0.75 | -1.58 |
| NYS | 52.88 | 24.00 | Cabletron Systems | 41.63 | -0.63 | -1.89 |
| OTC | 29.25 | 8.25 | Compression Labs Inc. | 22.25 | -2.50 | -10.10 |
| OTC | 5.13 | 1.50 | Data Switch Corp. | 1.63 | 0.00 | 0.00 |
| NYS | 21.50 | 11.00 | Digital Comm. Assoc. | 18.00 | -0.38 | -2.04 |
| OTC | 29.25 | 14.00 | Dynatech Corp. | 17.75 | -0.38 | -2.07 |
| OTC | 12.38 | 5.00 | Fibronix Int'l Inc. | 6.13 | -0.75 | -10.91 |
| OTC | 22.80 | 6.50 | FileNet Corp. | 19.13 | 0.88 | 4.79 |
| OTC | 3.75 | 1.75 | Gandalf Technologies Inc. | 1.88 | -0.25 | -11.75 |
| NYS | 3.88 | 1.88 | General Datacomm Inds. | 2.75 | -0.13 | -4.35 |
| NYS | 34.13 | 27.50 | GTE Corp | 31.38 | -0.88 | -2.71 |
| NYS | 63.00 | 44.88 | ITT Corp | 52.75 | -3.25 | -5.50 |
| OTC | 31.88 | 17.88 | MCI Communications Corp. | 27.88 | 0.88 | 3.24 |
| OTC | 14.50 | 3.25 | Microcom Inc. | 12.50 | -0.50 | -3.85 |
| NYS | 15.13 | 4.00 | Network Equipment Tech | 12.50 | -1.38 | -9.91 |
| OTC | 15.38 | 8.25 | Network General | 12.88 | -0.38 | -2.83 |
| OTC | 18.88 | 9.63 | Network Systems Corp. | 14.13 | -1.38 | -8.87 |
| NYS | 48.25 | 34.75 | Northern Telecom Ltd. | 43.38 | -0.63 | -1.42 |
| OTC | 51.75 | 14.00 | Novell Inc. | 49.88 | 3.63 | 5.56 |
| NYS | 79.25 | 67.00 | Nynex Corp. | 75.13 | -0.25 | -0.33 |
| NYS | 47.00 | 38.50 | Pacific Telesis Group | 40.25 | -1.75 | -4.17 |
| OTC | 11.63 | 4.50 | Penril Data Comm. Ntwks. | 6.75 | -0.38 | -5.38 |
| OTC | 43.50 | 8.50 | PictureTel Corp | 38.63 | 3.13 | 5.22 |
| NYS | 17.88 | 11.50 | Scientific Atlanta Inc. | 13.88 | -1.00 | -6.72 |
| NYS | 61.25 | 69.00 | Southwestern Bell Corp. | 67.50 | -1.25 | -2.13 |
| NYS | 31.80 | 20.63 | United Telecom | 22.25 | -0.63 | -2.73 |
| NYS | 40.75 | 34.00 | US West Inc | 34.00 | -1.38 | -3.55 |

**Computer Systems — Off 1.56%**

| Exch | 52-Week Range | | | Nov 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| OTC | 20.75 | 6.50 | Advanced Logic Research | 9.25 | -0.25 | -2.63 |
| ASE | 17.88 | 12.13 | Amdahl Corp. | 12.13 | -1.50 | -11.01 |
| OTC | 73.25 | 38.00 | Apple Computer Inc | 51.25 | 1.25 | 3.50 |
| OTC | 6.13 | 3.75 | Archive Corp | 3.75 | 0.00 | 0.00 |
| OTC | 32.75 | 12.38 | AST Research Inc | 16.63 | -1.38 | -7.84 |
| NYS | 9.38 | 4.25 | Bolt Beranek & Newman | 5.13 | 0.13 | 2.50 |
| NYS | 21.63 | 6.75 | Commodore Int'l | 12.25 | -0.63 | -4.85 |
| NYS | 74.25 | 24.00 | Compaq Computer Corp. | 25.00 | 0.38 | 1.52 |
| OTC | 3.63 | 0.38 | Computer Automation Inc. | 1.44 | -0.06 | -4.13 |
| NYS | 13.75 | 6.75 | Control Data Corp. | 9.38 | 0.13 | 1.35 |
| NYS | 19.75 | 6.00 | Convex Computer | 6.25 | -0.50 | -8.13 |
| NYS | 22.25 | 38.38 | Cray Research Inc. | 46.00 | -2.38 | -4.91 |
| NYS | 22.50 | 3.75 | Data General Corp. | 14.13 | -0.75 | -6.04 |
| NYS | 4.38 | 1.00 | Datapoint Corp. | 3.50 | 0.00 | 0.00 |
| OTC | 38.25 | 12.50 | Dell Computer Corp. | 24.38 | 2.13 | 9.55 |
| NYS | 83.00 | 47.50 | Digital Equipment Corp. | 60.63 | -0.63 | -1.02 |
| NYS | 39.88 | 18.25 | Harris Corp. | 23.63 | -1.38 | -5.50 |
| NYS | 56.63 | 27.13 | Hewlett Packard Co | 47.75 | 0.00 | 0.00 |
| NYS | 139.75 | 94.00 | IBM | 94.75 | -1.80 | -1.56 |
| OTC | 12.00 | 7.75 | Information Int'l | 9.25 | 0.00 | 0.00 |
| NYS | 145.75 | 106.00 | Matsushita Electronics | 108.75 | -6.00 | -5.32 |
| OTC | 20.88 | 7.50 | MIPS Computer Systems | 8.80 | 0.00 | 0.00 |
| OTC | 23.50 | 10.75 | Pyramid Technology | 13.63 | -0.13 | -0.91 |
| OTC | 18.75 | 7.80 | Sequent Computer Sys | 10.88 | -0.25 | -2.25 |
| NYS | 47.25 | 22.25 | Silicon Graphics | 46.75 | 3.38 | 7.75 |
| NYS | 69.88 | 20.00 | Stratus Computer Inc. | 40.50 | -0.75 | -1.22 |
| OTC | 36.63 | 18.13 | Sun Microsystems Inc. | 23.88 | -0.25 | -1.04 |
| NYS | 17.63 | 9.13 | Tandem Computers Inc. | 9.75 | -0.75 | -7.14 |
| OTC | 4.75 | 1.25 | Tandon Corp. | 1.50 | 0.06 | 4.31 |
| NYS | 26.50 | 23.38 | Tandy Corp | 26.25 | -1.50 | -5.41 |
| OTC | 24.80 | 6.25 | Teradata | 21.75 | 1.25 | 6.10 |
| NYS | 6.13 | 1.50 | Ultimate Corp | 1.75 | -0.13 | -6.67 |
| NYS | 7.00 | 2.00 | Unisys Corp. | 4.13 | 0.00 | 0.00 |
| ASE | 5.75 | 2.00 | Wang Labs Inc. (b) | 2.63 | -0.13 | -4.55 |

**Software & DP Services — Off 0.46%**

| Exch | 52-Week Range | | | Nov. 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| OTC | 63.00 | 23.50 | Adobe Systems Inc. | 48.25 | -4.75 | -8.96 |
| OTC | 12.25 | 3.50 | Aicorp | 7.00 | 0.63 | 9.80 |
| OTC | 39.88 | 23.13 | Aldus Corp. | 39.00 | 1.25 | 3.60 |
| OTC | 38.50 | 16.00 | American Mgmt. Systems | 18.25 | -0.25 | -1.35 |
| OTC | 17.25 | 6.00 | American Software Inc. | 13.13 | 0.13 | 0.96 |
| NYS | 4.63 | 1.50 | Anacomp Inc. | 3.50 | 0.38 | 12.00 |
| OTC | 18.25 | 11.88 | Analysts Int'l | 14.38 | -0.63 | -4.17 |
| OTC | 15.13 | 4.38 | ASK Computer Sys. | 12.25 | -0.75 | -5.77 |
| NYS | 39.75 | 25.00 | Auto Data Processing | 36.88 | -0.25 | -0.67 |
| OTC | 22.25 | 31.00 | Autodesk Inc. | 31.00 | -7.00 | -19.88 |
| OTC | 25.50 | 19.75 | BGS Systems Inc | 32.80 | -0.25 | -0.75 |
| OTC | 69.38 | 21.25 | BMC Software Inc. | 60.35 | 6.88 | 15.43 |
| OTC | 16.00 | 8.75 | Boole & Babbage Inc. | 13.63 | 0.50 | 3.81 |
| OTC | 74.50 | 25.00 | Borland Int'l | 74.50 | 7.50 | 11.19 |
| OTC | 20.88 | 7.38 | Cognos Inc. | 8.63 | -0.25 | -2.82 |
| NYS | 11.13 | 6.25 | Computer Associates | 9.38 | -0.25 | -2.60 |
| OTC | 17.75 | 9.00 | Computer Horizons | 9.75 | -0.13 | -1.27 |
| NYS | 75.25 | 46.13 | Computer Sciences | 65.38 | -1.25 | -1.88 |
| NYS | 11.25 | 7.00 | Computer Task Group | 7.50 | -0.63 | -7.69 |
| OTC | 22.75 | 13.00 | Comshare Inc. | 14.50 | 0.50 | 3.57 |
| OTC | 13.25 | 8.00 | Corporate Software | 10.75 | 0.00 | 0.00 |
| NYS | 58.88 | 35.00 | General Motors E (EDS) | 53.00 | -0.75 | -1.40 |
| OTC | 19.75 | 6.50 | Goal Systems Int'l | 9.50 | -0.50 | -5.00 |
| OTC | 7.00 | 1.88 | Hogan Systems Inc. | 5.25 | 0.38 | 7.69 |
| OTC | 39.25 | 6.88 | Information Resources | 20.25 | -1.38 | -6.36 |
| OTC | 15.88 | 2.63 | Informix Corp. | 14.13 | 0.63 | 4.63 |
| OTC | 3.63 | 1.06 | Intellicorp Inc. | 1.31 | 0.00 | 0.00 |
| OTC | 31.50 | 11.50 | Intergraph | 17.00 | -0.25 | -1.46 |
| OTC | 10.50 | 3.00 | Interleaf Inc. | 6.00 | 0.00 | 0.00 |
| OTC | 14.88 | 6.88 | Intersolv | 12.75 | -0.63 | -4.67 |
| OTC | 43.25 | 10.50 | Knowledgeware Inc. | 12.00 | 0.00 | 0.00 |
| OTC | 69.00 | 20.25 | Legent Corp | 32.75 | 1.00 | 3.15 |
| OTC | 40.75 | 14.75 | Lotus Development | 21.25 | -3.50 | -14.14 |
| OTC | 19.00 | 11.25 | Mentor Graphics | 14.63 | -0.38 | -2.30 |
| OTC | 32.00 | 9.75 | Micrografx | 14.75 | 1.00 | 7.27 |
| OTC | 101.75 | 69.25 | Microsoft Corp. | 96.00 | 1.00 | 1.05 |
| OTC | 16.63 | 5.50 | Oracle Systems | 14.38 | 0.63 | 4.55 |
| NYS | 16.25 | 7.75 | Panatophic Systems | 16.25 | 0.00 | 0.00 |
| OTC | 10.00 | 1.63 | Phoenix Technologies | 7.63 | -0.88 | -10.25 |
| OTC | 23.50 | 9.00 | Platinum Technology | 17.25 | 0.50 | 2.99 |
| NYS | 60.25 | 38.63 | Policy Management Sys. | 59.13 | -0.13 | -0.21 |
| NYS | 31.50 | 15.00 | Reynolds & Reynolds | 30.25 | -0.75 | -2.42 |
| OTC | 15.00 | 6.75 | Ross Systems | 11.25 | -1.75 | -13.46 |
| OTC | 27.50 | 16.75 | SEI Corp. | 23.13 | -0.13 | -0.54 |
| OTC | 23.38 | 13.88 | Shared Medical Systems | 19.13 | -0.63 | -3.18 |
| OTC | 35.25 | 13.25 | Software Publishing Corp. | 14.00 | 0.25 | 1.82 |
| NYS | 19.25 | 7.00 | Sterling Software | 17.13 | -0.38 | -2.14 |
| OTC | 18.25 | 9.88 | Sungard Data Sys. | 17.13 | -0.63 | -3.52 |
| OTC | 36.25 | 10.88 | Symantec Corp. | 38.75 | 1.38 | 5.02 |
| NYS | 13.75 | 4.50 | System Center Inc. | 11.00 | -1.25 | -10.20 |
| OTC | 37.38 | 12.50 | System Software Assoc. | 38.80 | 4.00 | 16.33 |

**Semiconductors — Off 1.50%**

| Exch | 52-Week Range | | | Nov. 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| NYS | 14.25 | 4.00 | Advanced Micro Devices | 13.88 | 1.25 | 9.90 |
| NYS | 12.50 | 5.75 | Analog Devices Inc. | 7.50 | -0.50 | -6.25 |
| OTC | 13.80 | 6.50 | Chips & Technologies | 8.13 | -0.13 | -1.52 |
| OTC | 66.25 | 34.00 | Intel Corp. | 41.00 | 0.00 | 0.00 |
| NYS | 12.80 | 5.38 | LSI Logic Corp. | 7.00 | -0.25 | -3.45 |
| NYS | 16.13 | 9.00 | Micron Technology | 12.80 | -0.25 | -1.98 |
| NYS | 71.25 | 45.75 | Motorola Inc. | 60.13 | -0.50 | -0.82 |
| NYS | 8.38 | 3.63 | National Semiconductor | 5.63 | 0.50 | 9.75 |
| NYS | 47.63 | 27.63 | Texas Instruments | 28.38 | -1.75 | -5.81 |
| OTC | 12.25 | 4.13 | VLSI Technology | 7.00 | 0.00 | 0.00 |
| OTC | 16.75 | 5.50 | Weitek | 5.75 | -0.25 | -4.17 |
| ASE | 6.75 | 2.13 | Western Digital Corp. | 2.38 | -0.38 | -13.64 |

**Peripherals & Subsystems — Off 1.7?%**

| Exch | 52-Week Range | | | Nov. 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| OTC | 2.75 | 1.00 | Apertus Technologies | 1.31 | 0.00 | 0.00 |
| OTC | 17.00 | 7.50 | Banctec Inc. | 15.25 | -0.50 | -3.17 |
| OTC | 27.75 | 8.25 | Cambex Corp | 24.25 | -0.50 | -2.09 |
| ASE | 11.75 | 5.75 | Cognitronics Corp. | 8.50 | 0.00 | 0.00 |
| NYS | 31.25 | 13.00 | Conner Peripherals | 13.50 | -0.25 | -1.83 |
| ASE | 16.88 | 7.50 | Dataram Corp. | 16.38 | -0.25 | -1.50 |
| NYS | 13.00 | 4.88 | EMC Corp. | 6.75 | 0.00 | 0.00 |
| NYS | 69.75 | 37.63 | Eastman Kodak Co. | 69.38 | 0.00 | 0.00 |
| OTC | 11.38 | 5.13 | Emulex Corp. | 5.63 | 0.13 | 2.27 |
| OTC | 24.00 | 14.75 | Evans & Sutherland | 19.25 | -1.75 | -8.33 |
| OTC | 8.00 | 4.00 | Iomega Corp. | 7.38 | 0.25 | 3.51 |
| OTC | 38.25 | 12.75 | IPL Systems Inc. | 15.50 | -2.50 | -13.89 |
| OTC | 8.25 | 1.63 | Maxtor Corp. | 4.88 | -0.38 | -7.14 |
| OTC | 16.00 | 5.50 | Micropolis Corp. | 8.38 | 0.88 | 11.67 |
| NYS | 97.50 | 75.25 | 3M Corp. | 86.88 | -2.63 | -2.97 |
| OTC | 10.75 | 5.50 | Printronix Inc. | 5.88 | -0.13 | -2.08 |
| NYS | 26.75 | 11.80 | QMS Inc. | 17.75 | -4.88 | -21.55 |
| OTC | 18.25 | 8.13 | Quantum Corp. | 9.88 | -0.25 | -2.47 |
| NYS | 8.00 | 4.38 | Recognition Equipment | 9.75 | -0.13 | -1.22 |
| OTC | 11.50 | 4.88 | Rexon Inc. | 7.25 | -0.13 | -1.69 |
| OTC | 18.88 | 7.13 | Seagate Technology | 9.00 | -0.25 | -2.70 |
| NYS | 61.50 | 17.75 | Storage Technology | 40.18 | 0.13 | 0.31 |
| NYS | 20.88 | 16.00 | Tektronix Inc. | 17.50 | 0.13 | 0.72 |
| OTC | 0.53 | 0.19 | Televideo Systems | 0.25 | 0.03 | 12.00 |
| NYS | 68.00 | 33.25 | Xerox Corp. | 61.63 | -1.38 | -2.19 |

**Leasing Companies — Off 1.69%**

| Exch | 52-Week Range | | | Nov. 22 Close | Wk Net Change | Wk Pct Change |
|---|---|---|---|---|---|---|
| OTC | 18.25 | 7.50 | Amplicon Inc. | 14.00 | 0.00 | 0.00 |
| NYS | 28.38 | 15.63 | Comdisco Inc. | 21.25 | -1.75 | -7.61 |
| OTC | 16.25 | 8.88 | LDI Corporation | 14.63 | 0.13 | 0.86 |

Note: On-Line Software was acquired by Computer Associates. Selecterm was deleted from Nasdaq. Both stocks were removed from our list accordingly.

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This information is obtained from sources believed to be reliable but cannot be guaranteed to be completely accurate. This information is subject to change without notice.

# IS urged to tackle LAN projects

BY JOANIE M. WEXLER
CW STAFF

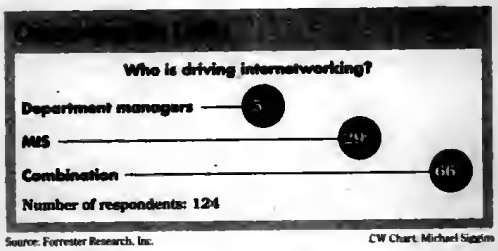
BOSTON — Information systems managers surrounded by shattering glass walls should grab opportunities in the interconnection of local-area networks to protect their futures, advised analysts at last week's Forrester Research, Inc. annual technology management forum here.

Forrester analysts told the 400 attendees at its network-oriented forum that managers would do well to turn their attention toward the emerging "grass roots" corporate network.

That network comprises internetworked LANs running multiple protocols over faster and increasingly reliable transmission lines.

Since hierarchical IBM Systems Network Architecture (SNA) networks will endure well into the 21st century, Forrester analysts said, the IS manager's major challenge is to build on that expertise to straddle SNA and new distributed networks.

Particularly ripe opportunities include championing a corporate strategy for network, systems and transmission planning and management, according to Janet L. Hyland, director of Forrester's network strategy research.




Source: Forrester Research, Inc.

CW Chart: Michael Siggins

The neophyte state of multi-LAN network management and emerging strategies for incorporating new high-speed telecommunications technologies in most companies leaves a slot for ambitious IS officials willing to broaden their horizons, she said.

For example, Forrester estimated that 40% of internetworking costs in Fortune 1,000 companies today go to transmission, leaving opportunity to put a network management organizational structure in place, Hyland said.

Corporatewide messaging and directory services will follow as areas of IS opportunity, according to Hyland.

Forrester analyst Mary Modahl agreed that IS "must be more fluid and responsive," because 50% of today's computing power on the desktop and LAN interconnect costs have been cut in half over the last year, fueling the LAN internetwork trend. She added that frame relay, an emerging wide-area technology that allows users to transmit more data over less bandwidth, will further blend SNA and LAN traffic.

### Corporate bottleneck

IS is currently seen as a bottleneck in some corporations. Forum attendee Tim Halvorson, a communications project leader at Minneapolis-based Northwest Airlines, for example, claimed a current "lack of synergy" with MIS at his company. "If MIS doesn't respond, we'll simply go out and hire our own MIS types; we have the authority to do that," he said.

However, Hyland said networks have become "too strategic for companies to hand over to an outsider. Outsourcing will be misplaced in the new corporate network."

Halvorson predicted a "big shift" to routed LAN internetworks at Northwest in 1992 as the airline moves its reservation system off its traditional SNA network and onto a distributed network environment.

# IBM sees surge in SNA as APPN rollout goes on

BY ELISABETH HORWITT
CW STAFF

BOSTON — IBM's Systems Network Architecture (SNA) is alive and well and will not be lost in the local-area network interconnectivity flurry, Ellen Hancock, IBM vice president and general manager of networking systems, said in an interview at last week's Forrester forum.

**Hancock:** *IBM to continue its rollout of APPN products*

Prior to her formal presentation, Hancock told reporters that IBM was seeing a "big surge in SNA here and especially in Europe," including rising use of the protocol to interconnet LANs. She cited three companies — one in the U.S. and two overseas — that recently opted for IBM's SNA-based Advanced Peer-to-Peer Networking (APPN) as the basis for their corporatewide LAN strategies.

IBM will continue in 1992 the aggressive rollout of APPN products it began this year, Hancock said. The vendor's multiprotocol router will support "full-function APPN," Hancock said. IBM has delayed the official announcement of the router from late this year to early next year, she added.

Also next year, IBM plans to implement APPN on its 3090 mainframe and to provide dynamic updating for Network Control Program tables for APPN devices, Hancock said. Both introductions are crucial elements of IBM's plans to extend APPN's routing and directory functions to host SNA networks.

Also key to IBM's APPN strategy are plans to route traditional terminal-to-host SNA applications over APPN networks. But IBM will probably not announce those specifics next year, Hancock said. "We know how to do it; it's just a matter now of getting all our product groups in line."

Those details are important given that the vast bulk of user applications still use traditional 3270-to-host connections.

### Specifications

IBM spokespeople hinted that the vendor does, indeed, intend to publish specifications for the APPN network node, which defines how a device can act as a server, router and client directory on an APPN network.

Novell, Inc. is likely to be among the first vendors to receive the specifications, according to Hancock. However, Apple Computer, Inc. has decided to limit Macintosh support to the end node, or client version of APPN, Hancock said.

IBM is also working on APPN+, a high-speed, multiprotocol version of its protocol that will be designed to run on top of the fast-packet switch that is also in the works at IBM, according to company spokesman Rick McGee.

# NEWS SHORTS

### Sinking barge cancels Jason class

A barge carrying the equipment necessary to broadcast the Electronic Data Systems Corp.-sponsored Jason project sank off the coast of Ecuador late last week, according to EDS. Next month's broadcast from the Galapagos Islands to some 1 million U.S. students would have been the fourth annual transmission in the award-winning Jason series, aimed at attracting schoolchildren to the sciences.

### TI, Hitachi to hatch DRAMs

Texas Instruments, Inc. and Hitachi Ltd. agreed last week to cooperate on the development of a 64M-bit dynamic random-access memory integrated circuit. The agreement, which grew out of TI and Hitachi's three-year agreement to develop and build 16M-bit DRAMs, will last for 10 years. A 64M-bit DRAM will contain 143 million transistors and store up to 2,800 pages of uncompressed text. Currently, 1M- and 4M-bit DRAMs dominate the market. Both companies have 64M-bit development efforts already under way.

### Cost-cutting is the goal

Goal Systems International, Inc. has joined the ranks of flattening organizations. For the first time in its 15-year history, and as part of a wider cost-cutting program, Goal has laid off 9% of its work force, or 88 employees. Other measures include planning to move to cheaper quarters next year, eliminating free munchies and switching to a spend-it-as-you-earn-it philosophy. "We're essentially changing our way of working [away] from investing heavily during the first half of the year, expecting revenue to follow," a spokeswoman said.

### Amdahl expands consulting effort

Amdahl Corp. last week announced four new consulting services: application design review, software release management, management of multiple system images and information systems service-level management. Service prices range from $35,000 to $150,000. Consulting now provides 2% of Amdahl's $2.1 billion in revenue; the goal is to boost that to 5%.

### Gateway leads *Inc.* 500 listing

North Sioux City, S.D.-based Gateway 2000 made it to the top of the entrepreneurial heap recently when it placed No. 1 in *Inc.* magazine's 500 fastest growing private companies list. The personal computer maker, which placed second last year, has grown from a $1 million business in 1986 to $275 million last year. The company is projected to have sales of $600 million this year, according to *Inc.* Gateway's success on the charts was no anomaly. Even with reports of slow growth in high-technology businesses, 135 computer firms made this year's list.

### Users line up for supercomputers

At least two organizations are standing in line for Cray Research, Inc.'s new Y-MP C90 supercomputer: the Pittsburgh Supercomputing Center and Westinghouse Electric Corp. The two institutions will share the supercomputer, which can cost as much as $30 million. A scaled-down version of Thinking Machines Corp.'s new CM-5 supercomputer will find a home at Sandia National Laboratories in Albuquerque, N.M.

### Chorus tunes up to Unix System V.4

The latest version of Unix System V Release 4 for high-end computers will be based on Chorus Systems, Inc.'s microkernel technology. The microkernel approach breaks up the operating system into components that are able to run on different processors and thus improve performance. Under a deal inked with Unix System Laboratories, Inc. (USL), Chorus will sell its microkernel Unix operating system, Chorus/Mix, to systems vendors. USL has also invested $1 million in Chorus. Unisys Corp. will soon announce its own Chorus-based System V Release 4 operating system, according to Chorus.

# Poor security made DOD easy hacker prey

BY MICHAEL ALEXANDER
CW STAFF

WASHINGTON, D.C. — Dutch hackers ransacked U.S. Department of Defense computers at 34 sites in April and May, in some cases modifying or copying information linked to military operations in the Persian Gulf war, an official at the General Accounting Office (GAO) said last week.

At many of the sites, the hackers were able to access sensitive, nonclassified information related to the transport of military personnel, equipment and weapons systems development data, said Jack Brock Jr., a GAO director, in testimony before the Senate Subcommittee on Government Information and Regulation.

Personnel information could be used to target employees who may be willing to sell classified information, Brock said. "Further, some DOD and government officials have expressed concern that the aggregation of unclassified, sensitive information could result in the compromise of classified information," he added.

U.S. troops in the Middle East were not jeopardized by the theft of the DOD information, but the GAO's findings indicate a "potentially serious threat to our national security," Sen. Herb Kohl (D-Wis.) said.

The hackers were able to weave their way across the Internet network through university, government and commercial computers, using those systems to carom into military computers, Brock said.

The hackers broke into the systems by exploiting widely known loopholes such as default passwords and flaws in computer operating systems. In many of the intrusions, the hackers modified systems to obtain system administrator privileges and create privileged accounts.

"It appears that we were lucky this time," Kohl said in a prepared statement.

The intrusions highlight how little attention U.S. government agencies give to computer security, despite the passage of the Computer Security Act of 1987, Congressman Dan Glickman (D-Kan.) told the subcommittee. Glickman had authored the act.

"Despite the obvious threat, our own government agencies are simply thumbing their noses at this law," Glickman said.

The security statute's intent is to improve the security and privacy of sensitive information in federal computers by establishing minimum security practices. The act, in part, requires agencies to identify computers with sensitive information and develop a security plan for them.

### Lack of security

The GAO reported in May 1990 that none of the agencies had fully implemented planned security controls, and only 38% of the 145 security plans had been put into place.

According to agency officials, budget constraints and inadequate top management support — in terms of resources and commitment — were key reasons that controls had not been implemented.

Foreign hackers have been able to freely penetrate a wide range of U.S. government computer systems in recent years. For example, Israeli officials said in September that an 18-year-old hacker had penetrated computers at the Pentagon and retrieved classified information related to the Patriot missile and other military secrets during the Persian Gulf war.

Also, a 20-year-old computer science student in Australia is awaiting trial on charges of allegedly hacking into U.S. government, university and commercial computers in February and March 1990. Prosecutors allege that the student shut down a NASA computer for 24 hours and destroyed computer files belonging to a Texas corporation, among other crimes.

# DEC looks to new boxes to singe Sun

CONTINUED FROM PAGE 1

Systems, Inc. R3000A chip — likely running at 33 MHz instead of the current 25 MHz. All 2,800 Ultrix applications will run on the new hardware, sources said. "Daughterboard" upgrades will be available between certain machines.

With this new hardware, DEC hopes to pump up its sinking market share and draw a little blood from Sun, its most implacable competitor on the desktop. Part of DEC's strategy for its new low-end machines is to encourage high-end personal computer users to make the leap from DOS to Unix-based workstations.

That scenario struck some analysts and users as unlikely, however.

"Top-of-the-line PC users aren't interested in switching," said Mohamed el Lozy, director of scientific computing at the Dana-Farber Cancer Institute in Boston. "In my environment are Apple Computer, Inc. Macintoshes, PCs and Unix machines. It's not a question of price so much as a different attitude."

One group of users who might be interested, however, are those with "more rigorous applications who are looking at client/server applications," Hurwitz said.

Even if the migration of PC users to the low-end models does not materialize, DEC could post some badly needed gains by keeping its own installed base faithful, analysts noted. "That's a very sensitive issue for DEC," said Steve Widen, an analyst at Workgroup Technologies, Inc. in Hampton, N.H. "They can't afford any erosion."

### DEC getting Sunburned

Workstation market figures from International Data Corp. (IDC) in Framingham, Mass., which are more conservative than some other market researchers, show that in 1990 worldwide, Sun shipped more than 146,000 workstations, while DEC shipped 64,000 — about 43,000 VAX/VMS machines and 21,000 Unix-based Decstations. IDC predicts DEC's 1991 growth at only 8% in a market where 30% growth is considered only a modest success.

"DEC has problems in every aspect of their workstation business," said Vicki Brown, vice president of systems research at IDC. "The market perception is that DEC is too slow and too late with products. Users don't feel DEC is on the power curve, and there's a perception problem about whether DEC is really committed to Unix."

Other hurdles include a sales force unsure of itself in the workstation arena and a long history of inadequate marketing, she added. "From a product perspective, this announcement sounds like it could get them back in the running, but there are a lot of other issues still to deal with," Brown said.

The economy could also block DEC's comeback scenario.

"We are not currently buying anything, but if we were buying, I might very well be excited about this," said el Lozy, whose shop includes substantial installations of both DEC and Sun machines. "DEC is definitely stepping in the right direction."

# Distributed management network tools on the way

CONTINUED FROM PAGE 1

alarms and traffic flow with database and CPU use, according to Mark Anderson, a leading network analyst.

"If you're getting bad performance, is it the CPU, the Ethernet or the lines? You have to have all the facts," he said.

Introductions scheduled for the first quarter will allow HP's Openview Network Node Manager and DEC's Decmcc Director to perform such functions as centralized backup, trouble ticketing, software distribution and configuration management for distributed client/server systems, spokesmen from both companies said.

The companies are also aggressively enhancing their support of the Simple Network Management Protocol (SNMP), a de facto standard for managing interconnected LANs.

HP, for example, plans to introduce software tools early next year that will enable users to enhance a given network device's ability to interact with an SNMP-compatible network management system.

DEC, meanwhile, is aggressively expanding the variety of devices that its SNMP management system can handle, according to William Gassman, the company's director of network management.

IBM — which is expected to bring out its own SNMP workstation by early next year — is clearly late to the party. However, it is doubtful whether DEC and HP's aggressive SNMP support will help their systems displace IBM's Netview as the favored "manager of managers" among multivendor shops, sources said.

Of 458 users recently surveyed by Datapro Information Services Group, 37% said they wanted IBM's Netview/Systemview as their network management standard, according to "Network Management Systems: User Perspectives Survey," a report the Delran, N.J., research firm plans to publish next month.

Open Systems Interconnect was a close second choice for users, with SNMP coming in third, Datapro reported.

### 3M picks Netview

3M, a combination IBM/HP/DEC shop, has already chosen Netview as the central system that collects network statistics and generates reports about the firm's growing, multivendor client/server installations, Anderson said. "Netview has been around the longest and generates a lot of the management reports now," he added.

3M now uses HP's Network Node Manager and is considering DEC's SNMP workstation to provide distributed management for client/server systems, Anderson said. The SNMP workstations would then feed up relevant statistics to Netview, he added.

Several users who had been briefed by the vendors said they eagerly await the promised systems management applications.

DHL Worldwide Express, for example, was upbeat about HP's plans to integrate its Openview and Probeview platforms next year. "That way, you have one workstation instead of two," said John Payne, a network analyst at DHL. Probeview is Microsoft Corp. DOS-based management software that collects information from HP's Lanprobe monitoring tools.

DHL said it was delighted with HP's recent disclosure that Openview will be able to manage HP's CCITT X.400-compliant electronic-mail system, beginning sometime next year. The new Openview application will enable DHL to centrally maintain distributed E-mail directories and manage performance on E-mail nodes, Payne said.

Both DEC and HP have turned to third-party software companies that specialize in certain key network systems management functions, company spokesmen said. DEC, for example, plans next year to ship the promised bidirectional link between Decmcc Director and IBM's Netview, which it is developing with Systems Center, Inc.

The California Legislature would love to have bidirectional exchange between its Decnet and IBM Systems Network Architecture management systems, according to Joseph Papa, a systems software specialist for the legislature.

Indeed, such a capability would greatly enhance Decmcc Director's viability to the organization, which is currently leaning toward using Netview as its central management system, Papa said.

# Fast systems no lure for commercial users

BY J. A. SAVAGE
CW STAFF

ALBUQUERQUE, N.M. — Capping a month of furious activity, the fourth annual Supercomputing '91 conference held here last week showed that while vendors may be capable of developing systems with speeds approaching 1 trillion floating-point operations per second (TFLOPS), those efforts still target research scientists.

The two major obstacles to commercial acceptance lie in a dearth of commercial applications and an abundance of proprietary systems. In a catch-22 of sorts, commercial supercomputing applications, while they do exist, remain an anomaly. Developing programs for the mainstream is said to be difficult because of the proprietary nature of the systems.

That is changing slowly, as supercomputer makers embrace standard reduced instruction set computing (RISC) microprocessors. Intel Supercomputers, a division of Intel Corp.; and Alliant Computer Systems Corp. introduced massively parallel systems using Intel's I860 RISC processor. Intel, in fact, joined Thinking Machines Corp. in the race to reach 1 TFLOPS in performance [CW, Nov. 18].

SUPERCOMPUTING '91

Cray Research, Inc. also disclosed its next-generation proprietary supercomputer, the 16-CPU, 16-GFLOPS Y-MP C90, at the conference. Cray has also promised a massively parallel supercomputer with up to 500 CPUs by 1993. A pending acquisition of some or all of Floating Point Systems, Inc. would "help the process" of moving in a less proprietary direction, according to Cray Chief Executive Officer John Rollwagon.

Research scientists, like those at the San Diego Supercomputer Center, are eager to get their hands on such powerful machines. But to exploit them, they have to build developers tools before applications can even be written. "One thing you can say about the software is it is not user-friendly," said D. Allan Bromley, White House science adviser.

Bromley said that by fiscal year 1995, the federal government plans to pump up to $1 billion per year into supercomputing development for software and hardware development. The government will need supercomputers that can reach 1 TFLOPS in the next few years, he said. "Otherwise, we will be swamped with data" from projects such as new weather satellites and atmospheric research on the greenhouse effect, he added.

Most supercomputers reside in research institutions, but a few have made their way into commercial sites. They tend to dwell in technical areas in industries such as geophysics in oil and gas exploration.

Walter Lynn, senior vice president of technology at Grant Tensor Geophysical Corp. in Houston, uses supercomputers to examine sections of earth. "It's an intense sequence of data processing to enhance signals and get rid of excess noise" from acoustic soundings, he said. With more powerful supercomputers, Grant Tensor hopes to vastly reduce computing time for acoustical and seismic data processing.

The one new commercial area for supercomputers is in high finance. Intel has sold its computers to Merrill Lynch & Co. and Prudential Securities, Inc. Prudential uses them to put packages of mortgage-backed securities together or analyze the risk of those securities for clients. Instead of taking an analyst overnight to determine potential risk and profit, it can be done while a client is still on the phone. Merrill Lynch's system is not on-line yet.

Outside of high finance and geophysics, users said they do not see supercomputers in the mainstream for several years.

"High-performance computing now is where regular computing was 10 years ago — almost everything is proprietary," said Robert Pollick, electronics engineer at Wright Laboratory in Dayton, Ohio.

# D&B Software guru to steer Lotus

CONTINUED FROM PAGE 1

"One concern is that Landry came back to D&B to set a new direction. Is it solid enough to go forward, or will it deteriorate back into the old M series vs. E series camps that existed before the merger?" Davey asked.

Last week, both Landry and D&B Software President and Chief Operating Officer Henry Holland moved to offer assurance that the mission was uninterrupted, despité Landry's departure.

"I came to D&B to [spearhead] the plans for a client/server architecture" and to see that plan into implementation, Landry said. "That job is done."

D&B Software's client/server product rollout, Holland added, "will go forward as planned," starting next month.

Nevertheless, Davey said, users are in for a season of confusion. "I mean, are we going to go back to debating over which way to go, which technology, which interpretation of the vision?" he asked. "Is there anyone left that can interpret the vision at all?"

According to Holland, there are no immediate plans to replace Landry.

The advent of Landry fills one of Lotus' most notable voids, Martin Simpson & Co. analyst Charlotte Walker said: the need for a technology visionary able to inspire developers to greater creativity and to spread the word to customers with the high-profile panache of Microsoft Corp. CEO Bill Gates or Borland International, Inc. CEO Philippe Kahn.

"They have that now with Landry," said Ron Zambonini, Cognos Corp.'s head of development, who served under Landry at Cullinet Software, Inc. "Developers love working for John; he brings out the best in them and then leaves them be."

### Crop of problems

King was brought aboard from IBM with similar fanfare three years ago, when the problem was getting the much-delayed 1-2-3 Version 3.0 spreadsheet out the door. "King did not fail; he succeeded beautifully," Weiler said last week. But one analyst wondered, "If he succeeded so well, why is he out the door?"

The answer may well be that while King fulfilled his role early on, problems cropped up later.

Lotus bet big on OS/2 and missed the first launch of the Windows boat. It was then forced to play catch-up in an increasingly competitive marketplace by dribbling out two interim releases: 3.1, a 1-2-3 version that ran under Windows but did not take advantage of Windows, and the follow-up, 3.1+.

When Lotus finally did produce a version of 1-2-3 for Windows, the company suffered the embarrassment of having to issue a free fix quickly to correct some shortcomings.

Lotus also found itself in the position of issuing a new release of 1-2-3 that lacked the desktop publishing and charting capabilities of a previous version.

Despite nailing down a pact with IBM that positions Lotus' CC:Mail package as an entry point into Officevision and that will result in some Notes features being moved into OS/2, sales growth is slowing, despite hopes for a big fourth quarter. After 1-2-3 for Windows shipped, its release was bungled, resulting in lukewarm reviews.

# IBM restructuring to shift power from mainframe execs

CONTINUED FROM PAGE 1

week, with reports that the company has doubled its near-term, head-count-shrinking goals. In addition to the 20,000-plus jobs to be eliminated by year-end 1991, IBM now plans to cut 20,000 in 1992, sources said.

IBM is speeding up the strategic agenda, several analysts said, because its traditional big-iron, big-ticket orientation leaves it out of step, out of choices and out of time.

Some product lines have already been shuffled, noted Ellen Hancock, IBM vice president and general manager of networking systems. IBM's Open Systems Interconnect Communications Subsystem, for example, was shifted from systems to Hancock's group, she said.

"The urgency was created by the marketplace," said longtime IBM watcher Robert Djurdjevic, president of Annex Research in Phoenix. "In the first half of 1991, not one of their product lines was doing really well."

Gains in better-selling lines — such as the Application System/400 and RISC System/6000 — have been consistently outdistanced by shortfalls in personal computers and big-ticket mainframes, analysts said.

During the past year, IBM has been hit with its first-ever quarterly loss, reported last April; an 85% profit drop in its most recently closed quarter; and a loss of approximately nine points of overall market share since 1986, according to Montgomery Securities in San Francisco. Perhaps most devastating, however, is the burgeoning indication that the post-Enterprise System/9000 mainframe resurgence IBM was banking on to revive its bottom line may be here — but probably not for long.

Third-quarter figures compiled by Montgomery Securities show mainframe order backlog increased dramatically: up 141% from last year's corresponding period. But intent-to-buy responses from the same survey of some 4,500 user sites was up a mere 3%.

Moreover, used-computer dealers expected a rich harvest this fall as newly acquired ES/9000 mainframes pushed a crop of older models onto the secondary market. Instead, they are finding slim pickings.

This is exactly the kind of writing on the wall that IBM can no longer avoid, said John B. Jones Jr., an analyst at Montgomery Securities. IBM's direction, he said, has long been charted by "guys who know, love and design mainframes." As a result, "too much technology has been tailored to, and targeted at, mainframes."

Now the mainframe crown is being melted down, refashioned and passed around. Several sources close to IBM said the firm will go several steps further next month to re-emerge as a centrally bonded family of business units.

"For instance," Djurdjevic said, "Bernard Puckett's line of business — Application Solutions — will become just that: a line of business, with its own command control and bottom-line responsibility."

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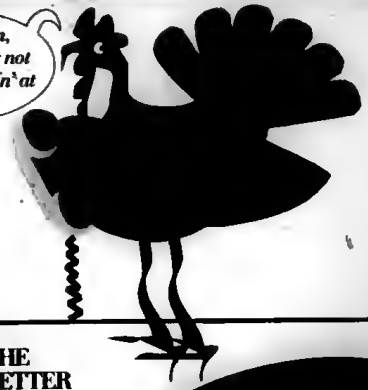
### What do you want to be when you grow up?

Programmer and systems analyst are still hot IS positions for recent grads, according to a study of 1,092 alumni of college computer science programs by the Association for Systems Management. The top five positions held by the respondents were as follows:

- Systems analyst
- 3GL programmer
- Systems programmer
- End-user support
- IS management, Consultant (tie)

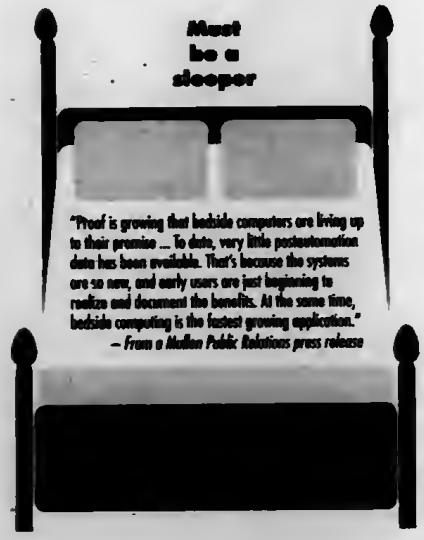
### DIAL T FOR TURKEY

Sprint Telemedia and Reynolds Metals Co. are offering a free service that provides consumers with cooking information for their turkeys. The Turkey Information Line can be reached at (800)745-4000 through Dec. 27.




**1.** The summer of 1977 was a major year for personal computers. What three famous PCs were introduced then?
**2.** In 1989, 16% of Next, Inc. was sold to a company for $100 million. Was it to IBM, Canon or Fujitsu?
**3.** What was the first major movie to use computer-aided animation: *Soylent Green*, *Futureworld* or *Star Wars*?
**4.** In 1968, The New York Stock Exchange listed its first computer software company. What was the name of that company?

Answers: 1. Trinity TRS-80, Commodore PET, Apple II; 2. Canon; 3. *Futureworld*; 4. Computer Sciences Corp.



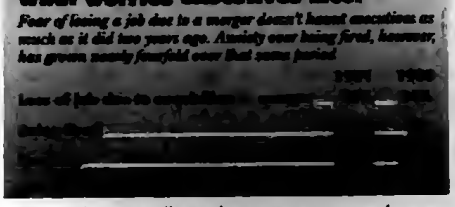

### FROM THE FORM LETTER HALL OF FAME...

*A letter from AT&T Easylink service to a customer who had complained about recent major hikes in electronic-mail rates*: "In our efforts to rationalize our rates across a broad and diverse base of customers and to continue providing effective and efficient products and services to all, some customers may not immediately recognize the issues and reasons that predicate such actions."

Fault tolerant: A general election in the state of California

### What worries executives most

*Fear of losing a job due to a merger doesn't haunt executives as much as it did two years ago. Anxiety over being fired, however, has grown nearly fourfold over that same period.*



▶ Do you have anecdotes about your users, your boss or your job? Know any industry trivia? If so, please contact Lory Zottola or Jodie Naze at (800) 343-6474. If we use your ideas, we'll send you a gift.

Sources: Robert Half International, Inc.; Ward Watch; Pearson Communications Group and the Delahaye Group; Special thanks to the Computer Museum, Boston

# INSIDE LINES

### Are we still engaged?

▶ Oracle, which recently opted not to accept $200 million in financing from Japanese industrial giant Nippon Steel, isn't willing to declare the relationship dead. Last week, Geoff Squire, Oracle's president of worldwide sales, said there are some signs that another deal is just around the corner. While Oracle is no longer interested in selling an equity stake, the company is open to a Nippon Steel loan — an investment in its Japanese subsidiary — and would consider partnering with the Japanese behemoth on systems integration projects. Happily, it appears that the dowry for the corporate marriage will be somewhat less than expected, too: "We'll probably need less of their money," Squire said.

### Peeling Apple's core

▶ The upheavals at Apple are taking their toll on employee stress levels, according to an annual internal survey of thousands of Apple workers. Overall, job satisfaction has declined, fewer workers are proud to work for Apple, and many are unhappy with promotion prospects, according to an electronic letter written to employees by Chairman John Sculley and President Michael Spindler and posted on the company's Applelink bulletin board system. "Although we've made great strides in furthering our business goals, [you believe] we've done this at your expense," the Sculley/Spindler response read.

### The old one-two

▶ Next is reportedly readying a January announcement that its object-oriented Nextstep operating system will be rewritten to run on machines using Intel chips and sold as a stand-alone product. That will make Nextstep attractive for millions of owners of IBM PCs and compatibles because it will mean simplified software sharing.

### Relief in sight

▶ Next Tuesday, Stratus and Novell are slated to announce a version of Netware ported to Stratus hardware. Netware users will be able to access Stratus transaction processing applications and take advantage of Stratus' fault-tolerant features. The timing of the announcement is curious, given Novell's stated goal to rewrite Netware so that it does not need to be altered to run on operating systems other than DOS. Meanwhile, Novell's Netware System Fault Tolerance III goes into beta testing in February.

### Do they know something we don't?

▶ Microsoft President Michael Hallman ditched a whopping 93% of his stock holding in the company late last month, according to reports filed with the Securities and Exchange Commission. Hallman sold 175,000 shares for an approximate total of $15.8 million less than nine months after exercising an option to receive the stock. Meanwhile, CEO Bill Gates unloaded 750,000 shares — or 1% of his stake — for $67.5 million a week earlier.

### Peace breaks out?

▶ Microsoft and IBM may be quelling their quarrels over OS/2. At PC Expo in Chicago, one Microsoft techie said word is out within the Redmond, Wash., software firm to stop bashing IBM. He said IBM seemed to be toning things down, too, as a presentation by Big Blue staffers deleted a couple of Bill Gates jokes and overt references to Windows' shortcomings it had contained when they saw it last summer.

*Most computer exhibits have more than their fair share of silly costumes and women who appear more for decoration than for knowledge of SCSI buses. Either supercomputer vendors are awfully serious about their products or they finally get the message that exploitation is not good for business: The Supercomputer '91 conference in Albuquerque, N.M., didn't have a single bear or "babe" on the exhibit floor. Guess when you're spending $30 million on a machine, you don't have time for fluff. Our News Editor Alan Alper has little time for fluff as well, but he's always interested in news. Phone him at (800) 343-6474; fax him at (508) 875-8931, or Compuserve him at 76537,2413.*

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